EPA/ROD/R08-90/031
1990

EPA Superfund
Record of Decision:

SAND CREEK INDUSTRIAL
EPA ID: COD980717953
OU 05
COMMERCE CITY, CO
09/28/1990

Text:

* EXCAVATION OF CONTAMINATED SURFACE SOILS WHICH ARE CONTAMINATED IN EXCESS OF ACTION LEVELS DESCRIBED IN TABLE 7.
* SOIL WASHING OF THE EXCAVATED SOIL TO TREATMENT LEVELS DESCRIBED IN TABLE 8.
* INCINERATION OF WASTEWATER.
* BACKFILL OF THE TREATED SOIL.
* GRADING AND REVEGETATING THE SOIL.

STATUTORY DETERMINATIONS

CONSISTENT WITH CERCLA AS AMENDED BY SARA AND THE NATIONAL CONTINGENCY PLAN, I HAVE DETERMINED THAT THE SELECTED REMEDY FOR OPERABLE UNIT NO. 5 OF THE SAND CREEK INDUSTRIAL SITE IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. I HAVE ALSO DETERMINED THAT THE REMEDY COMPLIES WITH FEDERAL AND STATE REQUIREMENTS THAT ARE LEGALLY APPLICABLE OR ARE RELEVANT AND APPROPRIATE TO THE REMEDIAL ACTION, AND IS COST EFFECTIVE. THE SELECTED REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE AND SATISFIES THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT THAT RESULT IN THE REDUCTION OF THE VOLUME, MOBILITY, AND TOXICITY OF SOIL CONTAMINATION AT THE SITE AS A PRINCIPAL ELEMENT.

BECAUSE THE SELECTED REMEDY MAY POSSIBLY RESULT IN HAZARDOUS SUBSTANCES REMAINING ON SITE ABOVE HEALTH-BASED LEVELS FOR A LAND USE NOT ANTICIPATED FOR THE AREA, A REVIEW OF THE REMEDIATION WILL BE CONDUCTED WITHIN FIVE YEARS AFTER COMMENCEMENT OF THE REMEDIAL ACTION, TO ENSURE THAT THE REMEDY CONTINUES TO PROVIDE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

JAMES J. SCHERER DATE: 09/28/90
REGIONAL ADMINISTRATOR
EPA REGION VIII

#SNLD
I. SITE NAME, LOCATION, AND DESCRIPTION

THIS RECORD OF DECISION (ROD) DESCRIBES THE REMEDIAL ACTION FOR HAZARDS FOR OU5, LOCATED WITHIN AND IMMEDIATELY ADJACENT TO THE COLORADO ORGANIC CHEMICAL COMPANY (COC) PROPERTY. THE HAZARDS ADDRESSED IN THIS REMEDIAL ACTION ARE SHALLOW SOILS CONTAMINATED WITH PESTICIDES AND METALS.

THE OU5 AREA IS LOCATED WITHIN THE SAND CREEK INDUSTRIAL SITE, A SITE LISTED ON THE NPL IN DECEMBER 1982. THE SAND CREEK INDUSTRIAL SITE IS LOCATED IN COMMERCE CITY, A CITY NORTH OF DENVER, COLORADO (FIGURE 1). THE SITE AND SURROUNDING AREA ARE INDUSTRIALIZED AND CONTAIN TRUCKING FIRMS, PETROLEUM AND CHEMICAL PRODUCTION/SUPPLY COMPANIES, WAREHOUSES, SMALL BUSINESSES, AND SEVERAL RESIDENCES. THE SITE STUDY AREA IS BOUNDED ON THE NORTH BY SAND CREEK, ON THE SOUTH BY 48TH AVENUE, AND ON THE EAST BY IVY STREET. THE WESTERN BOUNDARY IS APPROXIMATED BY COLORADO BOULEVARD, AND VASQUEZ BOULEVARD. FIGURE 2 ILLUSTRATES THE LOCATION AND BOUNDARIES OF OU5.

WITHIN THE SAND CREEK INDUSTRIAL SITE STUDY AREA, THERE ARE APPROXIMATELY 13 RESIDENCES WITH A TOTAL POPULATION OF ABOUT 25. THE DAY USE POPULATION, HOWEVER, REACHES SEVERAL HUNDRED DUE TO THE BUSINESS AND INDUSTRIAL NATURE OF THE STUDY AREA. WATER USERS WITHIN THE SITE STUDY AREA ARE SERVED BY THE SOUTH ADAMS COUNTY WATER AND SANITATION DISTRICT (SACWSD). PRIVATE WELLS EXIST ON THE SITE; HOWEVER, THIS WATER IS USED FOR INDUSTRIAL AND IRRIGATION PURPOSES.

TREATED GROUNDWATER IS THE SOURCE OF WATER SUPPLY TO THE SACWSD. PRODUCTION WELLS ARE LOCATED NORTH (DOWNGRADIENT) OF THE STUDY AREA. APPROXIMATELY 30,000 CUSTOMERS IN COMMERCE CITY AND ADAMS COUNTY ARE SERVED BY THE SACWSD.

OU5 IS LOCATED ABOVE THE 100-YEAR FLOODPLAIN OF SAND CREEK. THE MAJORITY OF OU5 IS LOCATED ON A BENCH OF RELATIVELY FLAT TERRAIN THAT SLOPES DOWN TO RAILROAD TRACKS TO THE NORTH AND RISES TO AN ALLUVIAL TERRACE TO THE SOUTH.

THE SAND CREEK INDUSTRIAL SITE LIES WITHIN THE VICINITY OF THREE OTHER SUPERFUND SITES; WOODBURY CHEMICAL, CHEMICAL SALES, AND ROCKY MOUNTAIN ARSENAL.

#SHEA
II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

THE COLORADO ORGANIC CHEMICAL COMPANY PLANT WAS FIRST OPERATED AT OU5 BY TIMES CHEMICAL IN THE 1960S TO MANUFACTURE PESTICIDES. THE COMPANY NAME WAS LATER CHANGED TO COLORADO INTERNATIONAL COMPANY (CIC). IN 1968, A FIRE DESTROYED THREE BUILDINGS AT THE CIC PLANT. AN INSPECTION OF CIC BY TRI-COUNTY DISTRICT HEALTH DEPARTMENT PERSONNEL IN JUNE 1974 INDICATED UNSATISFACTORY WASTE MANAGEMENT PRACTICES AND UNSATISFACTORY WORKER SAFETY CONDITIONS.

IN MARCH 1976, THE COLORADO DEPARTMENT OF HEALTH (CDH) CONDUCTED A FIELD INSPECTION AT CIC. THE INSPECTORS OBSERVED SEVERAL HUNDRED 55-GALLON DRUMS CONTAINING PESTICIDES STORED AT VARIOUS PLACES ACROSS THE COC AREA. THEY OBSERVED WASHWATER, STORM DRAINAGE, AND BOILER FEED WATER DRAINING INTO A COMMON SURFACE DRAINAGE THAT FLOWED OFF PROPERTY TOWARDS SAND CREEK. CIC WAS CITED FOR STORAGE AND HANDLING VIOLATIONS. A FIRE OCCURRED AT CIC IN DECEMBER 1977, RELEASING PARATHION FUMES OVER NORTHEAST DENVER. THE STATE OF COLORADO ISSUED AN EMERGENCY CEASE AND DESIST ORDER AGAINST CIC TO CLEAN UP THE COC PROPERTY AND ADJACENT AREAS CONTAMINATED BY THE FIRE. CIC DECLARED BANKRUPTCY AND RE-OPENED THE OPERATIONS AS COLORADO ORGANIC CHEMICAL (COC). COC OPERATIONS WERE ESSENTIALLY THE SAME AS CIC OPERATIONS.

SOIL SAMPLING AT COC IN EARLY 1978 REVEALED HIGH LEVELS OF ORGANOPHOSPHATE PESTICIDES, CHLORINATED HYDROCARBONS, AND THERMALLY-ALTERED PESTICIDES. THE STATE FILED A PRELIMINARY INJUNCTION AGAINST COC/CIC TO CLEAN UP THE RESIDUES OF THE FIRE. SOME CONTAMINATED SOIL WAS REMOVED IN OCTOBER 1978.

COC WAS CITED FOR UNSAFE DRUM STORAGE AND IMPROPER STORAGE AREAS UNDER RCRA REGULATIONS IN 1980. SAMPLES OF SURFACE LIQUIDS COLLECTED DURING THE INSPECTION REVEALED THAT SURFACE WATER DISCHARGE CONTAINED PESTICIDES (DIELDRIN, HEPTACHLOR, DDE, AND DDT), INORGANICS (CHROMIUM AND ARSENIC), AND OTHER ORGANICS (CHLORINATED BENZENES AND PHENOLS).

SUBSEQUENTLY, EPA FILED A NUMBER OF COMPLAINTS AGAINST COC FOR OTHER RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) VIOLATIONS. IN 1982, A CONSENT AGREEMENT AND FINAL ORDER WERE ISSUED FOR THE RCRA CASE. IN MARCH 1983, EPA REFERRED TO THE DEPARTMENT OF JUSTICE THE MATTER OF COC'S RCRA VIOLATIONS AND VIOLATION OF THE PREVIOUS SETTLEMENT. IN JUNE OF 1983 A SPILL OF THE HERBICIDE 2, 4-D RESULTED IN AN ADDITIONAL COMPLIANCE ORDER TO CLEAN UP THE SPILL AND TO COMPLY WITH PREVIOUS ORDERS. EPA ISSUED A CERCLA 106 ORDER IN MARCH 1984 FOR CLEANUP OF THE SITE. BETWEEN APRIL AND SEPTEMBER 1984, REMOVAL ACTION WAS TAKEN PURSUANT TO THOSE ORDERS BY COC, WHICH RESULTED IN THE REMOVAL OF DRUMMED WASTES AND PRODUCT, CONTAMINATED SOIL, AND FENCING OF THE SITE.

#HCP
III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

ALL REQUIREMENTS FOR PUBLIC PARTICIPATION IN SECTION 113(K) (2) (B) (I-V) AND 117 OF CERCLA WERE SATISFIED DURING THE REMEDIAL ACTION PROCESS.

COMMUNITY RELATIONS ACTIVITIES FOR THE SAND CREEK SITE BEGAN IN APRIL 1985 WHEN EPA DISTRIBUTED AN INTRODUCTORY FACT SHEET TO RESIDENTS, BUSINESSES, AND AGENCIES IN THE AREA. THE FACT SHEET DESCRIBED THE SITE AND EXPLAINED THE SUPERFUND PROCESS, WITH EMPHASIS ON THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS). IN THE NEXT FEW MONTHS, EPA PERSONNEL ATTENDED A PUBLIC MEETING ORGANIZED BY CITIZENS AGAINST CONTAMINATION; THEY ALSO COMPILED A LIST OF PEOPLE WHO OWNED PROPERTY IN THE STUDY AREA.

EPA MAILED A SECOND FACT SHEET IN NOVEMBER 1985. THIS FACT SHEET PROVIDED INFORMATION TYPICALLY REQUESTED DURING INVESTIGATION AND CLEANUP OF HAZARDOUS WASTE SITES. THAT SAME MONTH, EPA ALSO PROVIDED A REPORT ON WATER CONTAMINATION FOR ANOTHER PUBLIC MEETING OF CITIZENS AGAINST CONTAMINATION.

IN JANUARY 1986, EPA CONTACTED PROPERTY OWNERS AND COMMERCE CITY OFFICIALS TO INFORM THEM OF ACTIVITIES AT THE SITE. IN THE SPRING, EPA PREPARED A PHOTO DISPLAY ILLUSTRATING THE RI/FS PROCESS.

BECAUSE SOUTH ADAMS COUNTY GROUND-WATER CONTAMINATION AND ITS EFFECTS ON HOUSEHOLD SUPPLIES WERE OF CONCERN, EPA SURVEYED SOUTH ADAMS COUNTY RESIDENTS ABOUT THEIR WATER USE HABITS DURING APRIL 1987. LATER THAT YEAR, EPA SPOKE WITH RESIDENTS AND BUSINESSES NEAR THE SITE TO CHECK THE STATUS OF METHANE VENTING SYSTEMS NEAR THE 48TH AND HOLLY LANDFILL LOCATED IN THE SAND CREEK INDUSTRIAL SUPERFUND SITE LISTED ON THE NPL, NOW PART OF SAND CREEK OU3. THE LANDFILL OWNERS HAD INSTALLED THESE SYSTEMS AFTER AN EXPLOSION IN 1977 RESULTING FROM A BUILDUP OF METHANE THAT HAD MIGRATED FROM THE LANDFILL.

A REMEDIAL INVESTIGATION REPORT DESCRIBING THE EXTENT OF CONTAMINATION WITHIN THE COC AREA WAS RELEASED FOR PUBLIC REVIEW IN MARCH 1988. IN MAY 1988, EPA CONTACTED PROPERTY OWNERS TO OBTAIN PERMISSION TO SAMPLE AND MONITOR SOILS ON THOSE PROPERTIES.

IN OCTOBER 1988, EPA MET WITH COMMERCE CITY OFFICIALS TO INFORM THEM OF PLANS FOR THE SITE. THE COMMERCE CITY REPRESENTATIVES ALSO GAVE THEIR REACTIONS TO THE CLEANUP METHODS BEING CONSIDERED.

IN JANUARY 1989, THE FEASIBILITY STUDY (FS) WHICH FOCUSED PRIMARILY ON THE COC AREA WAS COMPLETED, AND A REMEDIAL ALTERNATIVE WAS PROPOSED. THE REMEDIAL ACTION INITIALLY PROPOSED WOULD HAVE INVOLVED: EXCAVATION AND OFF-SITE INCINERATION OF THE MOST HIGHLY CONTAMINATED SURFACE SOILS; VACUUM EXTRACTION OF VOC'S ABOVE THE GROUNDWATER TABLE; AND DEMOLITION AND OFF-SITE DISPOSAL OF THE CONTAMINATED TANKS AND BUILDINGS IN THE COC AREA.

EPA TOOK SEVERAL MEASURES TO ANNOUNCE THE PROPOSED REMEDIAL ALTERNATIVE CHOICE AND TO SEEK COMMENTS AND QUESTIONS FROM THE PUBLIC ON THE FEASIBILITY STUDY. FIRST, EPA MADE COPIES OF THE FS REPORT AVAILABLE TO THE PUBLIC IN THE ADAMS COUNTY PUBLIC LIBRARY, THE COLORADO DEPARTMENT OF HEALTH, AND THE EPA REGION VIII LIBRARY IN DOWNTOWN DENVER. AT THE SAME TIME, EPA MAILED ITS THIRD FACT SHEET, WHICH DESCRIBED A PROPOSED PLAN AS WELL AS FOUR OTHER REMEDIAL ALTERNATIVES THAT HAD BEEN EVALUATED. THIRD, EPA ANNOUNCED A PUBLIC COMMENT PERIOD DURING WHICH THE PUBLIC WAS INVITED TO SUBMIT COMMENTS AND QUESTIONS. THE COMMENT PERIOD ORIGINALLY RAN FROM JANUARY 13 TO FEBRUARY 13, BUT AT THE REQUEST OF THE POTENTIALLY RESPONSIBLE PARTIES (PRPS), EPA EXTENDED THE PERIOD

TO FEBRUARY 22. FOURTH, EPA CONDUCTED A PUBLIC MEETING ON JANUARY 31 TO DESCRIBE THE RESULTS OF THE RI/FS AND ANSWER QUESTIONS FROM THE PUBLIC. EPA PUBLISHED A PRESS RELEASE AND A PUBLIC NOTICE IN EACH OF THE COMMERCE CITY NEWSPAPERS, THE COMMERCE CITY SENTINEL AND THE COMMERCE CITY BEACON, ANNOUNCING ALL OF THESE ACTIVITIES.

IN RESPONSE TO PUBLIC COMMENT AND SUBSEQUENT RE-EXAMINATION OF THE SITE, A FS ADDENDUM WAS COMPLETED IN JULY 1989 WHICH PRESENTED TWO ADDITIONAL AND INNOVATIVE REMEDIAL TECHNOLOGIES FOR POTENTIAL USE ON THE CONTAMINATED SURFACE SOILS IN THE COC AREA: BIOLOGICAL TREATMENT AND SOIL WASHING. IT WAS CONCLUDED FROM THE FS ADDENDUM THAT TREATABILITY STUDIES WOULD BE REQUIRED BEFORE IMPLEMENTING EITHER OF THE ADDITIONAL ALTERNATIVES.

EPA MADE COPIES OF THE FS ADDENDUM REPORT AVAILABLE TO THE PUBLIC AND MAILED ITS FOURTH FACT SHEET DESCRIBING THE NEW PROPOSED PLAN. THE REMEDY SELECTED IN THE NEW PROPOSED PLAN INCLUDED: EXCAVATION AND OFF-SITE INCINERATION OF APPROXIMATELY 1,000 CUBIC YARDS (CY) OF SHALLOW SOILS HIGHLY CONTAMINATED WITH HOCS (LE 5 FT AND GT 1000 PPM); VACUUM EXTRACTION OF THE VOLATILE ORGANIC COMPOUNDS IN THE SUBSURFACE SOILS ABOVE THE GROUNDWATER TABLE; DEMOLITION AND OFF-SITE DISPOSAL OF THE CONTAMINATED TANKS AND BUILDINGS; AND EITHER BIOREMEDIATION OR SOIL WASHING FOR THE SHALLOW SOILS CONTAMINATED WITH HOCS ABOVE ACTION LEVELS. IT WAS PROPOSED THAT EXCAVATION AND OFF-SITE DISPOSAL OF THE CONTAMINATED SURFACE SOILS BE RETAINED AS A CONTINGENCY REMEDY, SINCE THE IMPLEMENTATION OF BIOREMEDIATION AND/OR SOIL WASHING DEPENDED UPON THE RESULTS OF TREATABILITY STUDIES TO BE PERFORMED SUBSEQUENT TO A RECORD OF DECISION. AN ABSENCE OF PROVEN BIOREMEDIATION AND/OR SOIL WASHING RESULTS ON SOILS CONTAMINATED WITH SIMILAR COMPOUNDS FURTHER WARRANTED RETENTION OF THE OFF-SITE DISPOSAL OPTION.

EPA PROVIDED A PUBLIC COMMENT PERIOD IN EFFECT FROM JULY 19 THROUGH AUGUST 21, 1989 DURING WHICH THE PUBLIC WAS INVITED TO SUBMIT COMMENTS AND QUESTIONS REGARDING THE FS ADDENDUM AND THE NEW PROPOSED PLAN. EPA CONDUCTED ANOTHER PUBLIC MEETING ON AUGUST 1 TO DESCRIBE THE NEW REMEDIAL ALTERNATIVE AND ANSWER QUESTIONS FROM THE COMMUNITY. PRESS RELEASES AND PUBLIC NOTICE WERE AGAIN PUBLISHED IN THE COMMERCE CITY SENTINEL AND THE COMMERCE CITY BEACON ANNOUNCING ALL THESE ACTIVITIES.

ONLY THE CITY OF COMMERCE CITY RESPONDED IN WRITING, AND THERE WAS LIMITED COMMENT ON THE SELECTED REMEDY DURING THE AUGUST 1 PUBLIC MEETING. THE PRIMARY CONCERN OF THE CITY OF COMMERCE CITY WAS THAT THE COC PROPERTY BE REMEDIATED TO RESIDENTIAL-USE STANDARDS. A RECORD OF DECISION WAS SUBSEQUENTLY PREPARED WHICH ADDRESSED ONLY THE HIGHLY CONTAMINATED SURFACE SOILS AND THE SUBSURFACE SOILS CONTAMINATED WITH VOLATILE ORGANIC COMPOUNDS. THE DECISION WAS TO IMPLEMENT THE PREFERRED ALTERNATIVE WHICH CONSISTED OF VACUUM EXTRACTION OF VOC'S, DEMOLITION AND OFF-SITE DISPOSAL OF THE CONTAMINATED TANKS AND BUILDINGS AND EXCAVATION AND INCINERATION OF HIGHLY HOC CONTAMINATED SOILS.

REMEDIAL ACTION ALTERNATIVES FOR THE REMAINING CONTAMINATED SURFACE SOIL WERE ADDRESSED IN A SECOND FEASIBILITY STUDY (FS OU5) WHICH INCORPORATED RESULTS FROM TREATABILITY TESTS. A PROPOSED PLAN WHICH WAS PREPARED AND SENT OUT TO THE PUBLIC ON JULY 30, 1990. A PUBLIC MEETING WAS HELD AUGUST 9TH, AT 7:00 PM AT THE COMMERCE CITY COMMUNITY ROOM IN COMMERCE CITY. A RESPONSIVENESS SUMMARY ADDRESSING THE PUBLIC'S COMMENTS ON OU5 WAS PREPARED AND IS ATTACHED TO THIS RECORD OF DECISION.

#SROU
IV. SCOPE AND ROLE OF OPERABLE UNIT RESPONSE ACTION

DURING THE COURSE OF THE REMEDIAL INVESTIGATION, CONDUCTED FROM 1984 TO

1988, EPA DETERMINED, IN ACCORDANCE WITH 40 CFR SECTION 300.68(C), OF THE 1985 NCP THAT THE FEASIBILITY STUDY SHOULD BE DIVIDED INTO OPERABLE UNITS IN ORDER TO REMEDIATE SITE-SPECIFIC PROBLEMS. THIS CONFORMS WITH SECTIONS 300.5 AND 300.430 OF THE NEW NCP (MARCH 8, 1990).

ORIGINALLY, THE SAND CREEK INDUSTRIAL SITE WAS DIVIDED INTO FOUR OPERABLE UNITS ACCORDING TO THE TYPE OF CONTAMINATION PRESENT, TYPE OF MEDIA AFFECTED, AND PHYSICAL CHARACTERISTICS OF THE UNITS. THE FOUR ORIGINAL OPERABLE UNITS ARE DESCRIBED BELOW:

OPERABLE UNIT NO. 1 - SOILS CONTAMINATED BY PESTICIDES, VOLATILE ORGANICS, ARSENIC, AND CHROMIUM IN THE COLORADO ORGANIC CHEMICAL (COC) AREA; CONTAMINATED BUILDINGS AND TANKS IN THE COC AREA;

OPERABLE UNIT NO. 2 - CONTAMINATED SOILS AND GROUND WATER IN THE VICINITY OF THE L.C. CORPORATION PROPERTY;

OPERABLE UNIT NO. 3 - GASEOUS EMISSIONS, CONTAMINATED SURFACE WATER AND GROUND WATER IN THE VICINITY OF THE 48TH AVENUE AND HOLLY STREET LANDFILL;

OPERABLE UNIT NO. 4 - CONTAMINATED GROUND WATER UNDERLYING THE ENTIRE NPL SITE.

AS DISCUSSED IN SECTION III, TREATABILITY TESTS WERE REQUIRED TO DETERMINE THE POTENTIAL EFFECTIVENESS OF THE BIOREMEDIATION AND/OR SOIL WASHING OPTIONS FOR SOILS CONTAMINATED WITH HOC'S ABOVE HEALTH BASED ACTION LEVELS. IN AN EFFORT TO EXPEDITE REMEDIATION WHILE THE TREATABILITY STUDIES WERE BEING PERFORMED, THE ORIGINAL SCOPE OF THE REMEDIATION DESCRIBED IN THE OU1 PROPOSED PLAN WAS REDUCED. ACCORDINGLY, OU1 WAS REDUCED IN SCOPE TO INCLUDE ONLY THE MOST HIGHLY CONTAMINATED SURFACE SOILS, THE TANKS, BUILDINGS AND OTHER STRUCTURES; AND THE VOC CONTAMINATED SUBSURFACE SOILS. A NEW OPERABLE UNIT, OU5, WAS DEFINED TO ADDRESS THE REMAINING PESTICIDE AND METALS CONTAMINATED SURFACE SOILS.

THE REDEFINITION OF OPERABLE UNITS WILL NOT REDUCE THE OVERALL PLAN FOR REMEDIATION AT THE SAND CREEK INDUSTRIAL SITE. OUS 2, 3 AND 4 REMAIN UNCHANGED. AS OF THE DATE OF THIS ROD, THE SAND CREEK INDUSTRIAL SITE HAS BEEN SUBDIVIDED INTO THE SIX OPERABLE UNITS DESCRIBED BELOW:

OPERABLE UNIT NO. 1 - WITHIN THE COC AREA, EXCAVATION OF 10 CY OF SOILS HIGHLY CONTAMINATED WITH PESTICIDES (CONCENTRATIONS GE 1,000 PPM HALOGENATED ORGANIC COMPOUNDS); SUBSURFACE SOIL CONTAMINATED WITH VOLATILE ORGANIC COMPOUNDS; AND CONTAMINATED BUILDINGS AND TANKS;

OPERABLE UNIT NO. 2 - CONTAMINATED SOILS AND GROUND WATER IN THE VICINITY OF THE L.C. CORPORATION PROPERTY;

OPERABLE UNIT NO. 3 - CONTAMINATED SURFACE WATER AND GROUND WATER (CLASS II AQUIFER) IN THE VICINITY OF THE 48TH AVENUE AND HOLLY STREET LANDFILL;

OPERABLE UNIT NO. 4 - CONTAMINATED GROUND WATER UNDERLYING THE ENTIRE SITE;

OPERABLE UNIT NO. 5 - WITHIN THE COC AREA SURFACE SOILS CONTAMINATED WITH ARSENIC, CHROMIUM AND PESTICIDES (CONCENTRATIONS LT 1,000 PPM HALOGENATED ORGANIC COMPOUNDS).

OPERABLE UNIT NO. 6 - GASEOUS EMISSIONS FROM THE 48TH AVENUE AND HOLLY STREET LANDFILL.

THIS RECORD OF DECISION ADDRESSES REMEDIATION OF OPERABLE UNIT NO. 5. REMEDIATION OF THE REMAINDER OF THE SITE WILL BE ADDRESSED IN SEPARATE

DECISION DOCUMENTS.

THE PURPOSE OF THE RESPONSE ACTION FOR OU5 IS TO PROTECT SURFACE WATER AND GROUNDWATER RESOURCES, AND ADDRESS THE PRINCIPAL THREAT IN THIS OU BY PREVENTING DIRECT CONTACT WITH CONTAMINATED SOILS BY THE PUBLIC AND SITE WORKERS. THIS DECISION REPRESENTS THE SECOND REMEDIAL ACTION DECISION FOR THIS NPL SITE, AND UPON COMPLETION, WILL ALLOW THE COC AREA TO BE RETURNED TO INDUSTRIAL USE.

#SSC
V. SUMMARY OF SITE CHARACTERISTICS

CONTAMINANT CHARACTERISTICS

THE CONTAMINANTS OF CONCERN AT THE SAND CREEK SITE OU5 INCLUDE THE METALS; CHROMIUM, ARSENIC, AND THE PESTICIDES DIELDRIN, HEPTACHLOR, 2,4'-D, 4-4 DDT, AND CHLORDANE. MOST OF THE CONTAMINATION PRESENT IN CONCENTRATIONS ABOVE ACTION LEVELS IS LOCALIZED IN HOT SPOTS IDENTIFIED DURING THE REMEDIAL INVESTIGATION. ANALYTICAL RESULTS OF SOIL SAMPLES INDICATED CHLORINATED PESTICIDES ARE PRESENT IN CONCENTRATIONS ABOVE ACTION LEVELS IN THE SURFICIAL AND/OR SHALLOW SOILS THROUGHOUT THE OU5 AREA. HIGH CONCENTRATIONS OF ARSENIC HAVE BEEN DETECTED IN SURFICIAL AND SHALLOW SOILS ON THE COC PROPERTY AND THE NORTHERN PORTION OF OU5 IN LOCALIZED HOT SPOTS WITHIN AREAS CONTAMINATED WITH PESTICIDES ABOVE ACTION LEVELS. FIGURE 3 SHOWS THE APPROXIMATE AREAL EXTENT OF CONTAMINATION AT THE 0-1', 1'-3', AND 3'-5' DEPTH. THE SOIL VOLUMES TO BE REMEDIATED ARE DEFINED BY THE ACTION LEVELS FOR DIELDRIN AND HEPTACHLOR. THESE COMPOUNDS PRESENT THE GREATEST RISK BASED ON THEIR TOXICITIES. THESE COMPOUNDS ARE ALSO REFLECTIVE OF THE TOTAL AREAL EXTENT OF THE OTHER COMPOUNDS. THEREFORE, THE REMAINING COMPOUNDS WOULD BE INHERENTLY REMEDIATED DURING THE CLEANUP ACTIVITIES FOCUSED ON THE SOIL VOLUMES FOR DIELDRIN AND HEPTACHLOR.

AFFECTED MATRICES CHARACTERISTICS

OPERABLE UNIT NO. 5 HAS BEEN DEFINED AS CONTAMINATED SOILS NOT ADDRESSED BY OU1 AT THE COC AREA. THE OU5 SOILS INCLUDE SURFACE SOILS CONTAMINATED WITH ARSENIC, CHROMIUM, AND PESTICIDES (LT 1,000 PPM HOC'S). THE CONTAMINANTS ARE FOUND DISTRIBUTED IN MANY LOCATIONS THROUGHOUT THE SITE, MOSTLY IN LOCALIZED HOT SPOTS. THE SURFACE SOIL IS FOUND TO CONTAIN HIGHER CONCENTRATIONS OF PESTICIDES THAN SOILS AT DEPTH.

THE VOLUMES OF SOIL TO BE REMEDIATED WERE CALCULATED FOR THE COMPOUNDS WHICH PRESENT THE GREATEST HEALTH RISK. THOSE COMPOUNDS WERE FOUND TO BE DIELDRIN AND HEPTACHLOR. TOTAL SOIL VOLUME CALCULATED FOR REMEDIATION OF BOTH COMPOUNDS IN THE REASONABLE MAXIMUM EXPOSURE SCENARIO IS APPROXIMATELY 14,000 CUBIC YARDS. SOIL VOLUMES FOR OTHER COMPOUNDS WERE NOT CALCULATED SEPARATELY SINCE THEY ARE ADDRESSED IN THE SOIL VOLUMES FOR DIELDRIN AND HEPTACHLOR.

POTENTIALLY EXPOSED POPULATIONS

THE CURRENT POPULATION AT RISK OF EXPOSURE CONSISTS OF INDUSTRIAL WORKERS AT THE SITE AND SURROUNDING BUSINESS LOCATIONS. THE RISK ASSESSMENT FOR THE SITE DELINEATES THE EXPOSURE PATHWAYS AND PRESENTS THE POTENTIAL HEALTH RISKS TO THE INDUSTRIAL WORKER. CURRENTLY, THERE ARE NO RESIDENCES WITHIN THE SITE BOUNDARIES AND A RELATIVELY MINOR POPULATION OF LESS THAN 25 RESIDENCES EXISTS IN THE AREA. THE NEAREST RESIDENTS ARE LOCATED THREE QUARTERS OF A MILE FROM THE SITE. THE CITY OF COMMERCE CITY PRESENTLY HAS THIS AREA DESIGNATED FOR INDUSTRIAL USE THROUGH THE YEAR 2010, CONSISTENT WITH PRESENT AND HISTORIC USE FOR THE

SURROUNDING AREA.

MIGRATION PATHWAYS

THE POTENTIAL MIGRATION PATHWAYS FOR THE CONTAMINANTS INCLUDE SURFACE WATER RUN OFF, AIRBORNE DISTRIBUTION AND GROUNDWATER MIGRATION. SURFACE WATER RUNOFF IS THE MOST PROBABLE PATHWAY DUE TO THE FACT THE SURFACE SOILS ARE THE MOST HIGHLY CONTAMINATED. AIRBORNE DISTRIBUTION WOULD BE POSSIBLE DURING ANY HIGH CONSTRUCTION ACTIVITIES OCCURRING AT THE SITE BUT OTHERWISE WOULD NOT BE CONSIDERED A MAJOR MIGRATION PATHWAY SINCE THE CONTAMINANTS ARE NOT HIGHLY VOLATILE AND NATURAL VEGETATION COVERS MUCH OF THE SITE. GROUNDWATER MIGRATION IS NOT A PRIMARY CONCERN DUE TO THE TENDENCY OF THE CONTAMINANTS OF INTEREST TO ADHERE TO SOIL PARTICLES. DOWNWARD MOVEMENT OF CONTAMINANTS WOULD OCCUR SLOWLY WITH WATER INFILTRATION RATES COMMON TO THE AREA.

#SSR
VI. SUMMARY OF SITE RISKS

AN ENDANGERMENT ASSESSMENT (EA) FOR OU1 WAS CONDUCTED FOR THE SAND CREEK SITE (CDM 1988) TO EVALUATE THE RISKS POSED BY THE PRESENCE OF CONTAMINATED SOILS IN THE COC AREA. THE RESULTS OF THE 1988 EA WERE USED IN THE OU1 ROD.

THE 1990 EA FOR OU5 UTILIZING THE RISK ASSESSMENT GUIDANCE (JULY, 1989) IDENTIFIED A NUMBER OF CHEMICAL COMPOUNDS THAT BECAUSE OF HEALTH RISKS, ARE CHEMICALS OF CONCERN FOR OU5. THE CHEMICALS OF CONCERN IDENTIFIED IN THE INITIAL RI/FS (CDM 1987) WERE USED IN PREPARING THE OU5 ENDANGERMENT ASSESSMENT WHICH INCORPORATED NEW DATA OBTAINED DURING OU1 REMEDIAL DESIGN ACTIVITIES. NEW ACTION LEVELS AND SOIL VOLUMES WERE A RESULT OF THIS EFFORT.

THE OBJECTIVES OF THE RISK ASSESSMENT WERE TO IDENTIFY CHEMICALS OF CONCERN, DEFINE EXPOSURE PATHWAYS; DETERMINE EXPOSURE POINT CONCENTRATIONS, ESTIMATE HUMAN INTAKES, IDENTIFY KNOWN HAZARDS FOR EACH CHEMICAL OF CONCERN, AND DETERMINE A CARCINOGENIC AND NONCARCINOGENIC RISK FOR THE CHEMICALS OF CONCERN.

THE CHEMICALS OF CONCERN WERE FIRST IDENTIFIED IN THE ORIGINAL 1988 SITE WIDE ENDANGERMENT ASSESSMENT. THE SELECTION PROCESS FOR CHEMICALS OF CONCERN WAS ORIGINALLY PRESENTED SEPARATELY FOR EACH MEDIUM. FOR THE OU5 RISK ASSESSMENT, ONLY CONTAMINANTS IDENTIFIED AS CHEMICAL OF CONCERN FOR SOILS WERE ADDRESSED. THESE CHEMICALS OF CONCERN ARE; ARSENIC, CHROMIUM, CHLORDANE, 2-4D, 4,4-DDT, DIELDRIN, AND HEPTACHLOR.

THE EXPOSURE PATHWAYS WERE IDENTIFIED IN THE RISK ASSESSMENT AND ARE SUMMARIZED IN TABLES 1 AND 2. THE EXPOSURE ROUTE FOR WIND EROSION AIRBORNE PARTICULATES IS INHALATION. THE EXPOSURE ROUTES FOR DIRECT CONTACT WITH SOIL ARE INGESTION AND DERMAL ABSORPTION.

THE SITE ASSUMPTIONS USED FOR THE RISK CALCULATIONS INCLUDING ROUTE, MEDIUM, GROUP, FREQUENCY, AND DURATION ARE SUMMARIZED IN TABLE 3. THE ASSUMPTIONS USED FOR HUMAN INTAKE INCLUDING; AGE, INGESTION, INHALATION, EXPOSED SKIN, BODY WEIGHT, AND TIME ON-SITE ARE ALSO INCLUDED IN TABLE 3. ALTHOUGH THE REASONABLE MAXIMUM EXPOSURE SCENARIO FOR THE AREA IS INDUSTRIAL, RISK CALCULATIONS WERE MADE FOR INDUSTRIAL AND RESIDENTIAL SCENARIOS FOR COMPARISON PURPOSE. THE CITY OF COMMERCE CITY HAS PREVIOUSLY ASKED FOR THIS COMPARISON.

IN ORDER TO ADDRESS AREAS AFFECTED BY HIGH CONCENTRATIONS OF PESTICIDES AND AVERAGE CONCENTRATIONS OF PESTICIDES, THE DATA WERE SEPARATED INTO "HOT SPOT" CONTAMINATION AND AVERAGE CONTAMINATION.

HOT SPOT CONTAMINATION REPRESENTS A POTENTIAL MAXIMUM EXPOSURE FOR THE CHEMICALS PRESENT AT HIGH CONCENTRATIONS. BOTH MAXIMUM AND AVERAGE CONCENTRATIONS WERE USED IN RISK CALCULATIONS. EXPOSURE POINT CONCENTRATIONS FOR THE SITE AVERAGE AND HOT SPOTS WERE DETERMINED FROM THE COMBINED DATA SETS OF OU1 AND OU5. THESE VALUES ARE PRESENTED IN TABLE 4.

BEST ESTIMATES OF THE AVERAGE EXPOSURE CONCENTRATIONS WERE DETERMINED BY THE 95 PERCENT CONFIDENCE LEVEL OF THE ARITHMETIC MEAN FOR EACH CHEMICAL OF CONCERN. HOT SPOTS VALUES WERE DETERMINED FROM ANALYTICAL RESULTS FOR THE HIGH CONCENTRATION AREAS. THESE VALUES ARE PRESENTED IN TABLE 4. THESE VALUES WERE THEN USED IN THE CALCULATIONS SHOWN ON TABLES 5 AND 6. TABLE 5 SHOWS THAT THE SITE AVERAGE RISK IS WITHIN THE EPA'S ACCEPTABLE RISK RANGE TABLE 6, HOWEVER, SHOWS THAT THE HOT SPOTS ON THE SITE FALL OUTSIDE EPA'S ACCEPTABLE RISK RANGE OF (10-4) TO (10-6). AS WAS SHOWN IN FIGURE 3, THE HOT SPOTS COMPRISE MOST OF THE OU5 AREA, THUS REQUIRING REMEDIATION. SOIL CONCENTRATIONS FOR NON CARCINOGENIC AND CARCINOGENIC RISKS OF (10-6) ARE ALSO PRESENTED ON THE TABLES. BY OBTAINING THE SOIL CONCENTRATIONS THROUGH REMEDIATION, THE EXCESS LIFETIME CANCER RISK FROM COMBINED EXPOSURE TO ALL COMPOUNDS WOULD BE WITHIN THE EPA ACCEPTABLE (10-4) TO (10-6) RANGE. WITHOUT REMEDIATION OF THE HOT SPOTS, THE BASELINE SITE RISK PRESENTED BY THE HOT SPOTS WOULD BE 2.41 X (10-3), OUTSIDE THE ACCEPTABLE RISK RANGE.

TABLE 1

EXPOSURE PATHWAYS IN OU5
REASONABLE MAXIMUM EXPOSURE SCENARIO: INDUSTRIAL

SOURCE	RELEASE MECHANISM	RELEASE MEDIUM
COC FACILITY	SPILLS LEAKS	SOIL
CONTAMINATED SOIL	WIND EROSION DUST GENERATION	AIR
CONTAMINATED SOIL	VEHICULAR TRAFFIC	AIR

SOURCE	TRANSPORT MEDIUM	EXPOSURE POINT
COC FACILITY	SURFACE SOILS	ENTIRE SITE
CONTAMINATED SOIL	AIRBORNE PARTICULATES	ENTIRE SITE
CONTAMINATED SOIL	AIRBORNE PARTICULATES	ENTIRE SITE

TABLE 2

CONTAMINANTS, ROUTES AND SOURCES
OF EXPOSURES TO BE ADDRESSED IN THE RISK ASSESSMENT

CONTAMINANTS EVALUATED

METALS	INSECTICIDES	HERBICIDES
ARSENIC	CHLORDANE	2,4-D
CHROMIUM	4,4' -DDT	
	DIELDRIN	
	HEPTACHLOR	

EXPOSURE ROUTES AND SOURCES

RECEPTOR	ROUTE	SOURCE
WORKER	INHALATION	AIR/PARTICULATES
	INGESTION	SOIL
	DERMAL CONTACT	SOIL
CHILD		
	INHALATION	AIR/PARTICULATES
	INGESTION	SOIL
	DERMAL CONTACT	SOIL

TABLE 3

ASSUMPTION SUMMARY FOR RISK EVALUATIONS

ROUTE	MEDIUM	GROUP
INHALATION	AIRBORNE SOIL	CHILDREN
	AIRBORNE SOIL	WORKER
	AIRBORNE SOIL	RESIDENT
INGESTION	SOIL	CHILDREN
	SOIL	WORKER
	SOIL	RESIDENT
DERMAL CONTACT	SOIL	CHILDREN
	SOIL	WORKER
	SOIL	RESIDENT

ROUTE	MEDIUM	GROUP	FREQUENCY	DURATION
INHALATION	AIRBORNE SOIL	CHILDREN	40 DAYS YEAR 5 HRS DAY	5 YEARS
	AIRBORNE	WORKER	170 DAYS 8 HRS	30 YRS
	AIRBORNE	RESIDENT	183 DAYS AGE	70 YRS
	SOIL		YEAR SPECIFIC	
INGESTION	SOIL	CHILDREN	40 DAYS YEAR	5 YEARS
	SOIL	WORKER	240 DAYS YEAR	30 YEARS
	SOIL	RESIDENT	365 DAYS YEAR	70 YRS
DERMAL CONTACT	SOIL	CHILDREN	40 DAYS YEAR	5 YEARS
	SOIL	WORKER	240 DAYS YEAR	30 YRS
	SOIL	RESIDENT	365 DAYS YEAR	70 YRS

INTAKE ASSUMPTIONS

AGE	INGESTION RATE MG/DAY	INHALATION RATE M (3)/HR	EXPOSED SKIN SURFACE AREA M (2)
0 - 1	0.0	.21	0.0
1 - 6	200	.21	0.36
6 - 9	100	.80	0.49
9 - 11	100	1.00	0.62
11 - 17	100	1.05	0.50
ADULT	100	1.05	0.50

AGE	BODY WEIGHT KG	RESIDENTIAL TIME ON SITE HRS
0 - 1	16	20
1 - 6	16	20
6 - 9	25	16
9 - 11	35	16
11 - 17	50	14
ADULT	70	14

TABLE 4

EXPOSURE POINT CONCENTRATIONS

	SURFACE(A) (PPM)	(HOT SPOT) SURFACE(B) (PPM)
ARSENIC	18.04	
CHROMIUM	55.64	
CHLORDANE	20.94	355.00
DIELDRIN	3.95	343.00
DDT	89.24	
2,4-D	1.16	38.00
HEPTACHLOR	3.70	10.20

A. 95 PERCENT CONFIDENCE LEVEL OF THE ARITHMETIC MEAN.
B. MAXIMUM CONCENTRATION.

THE GENERAL HAZARDS ASSOCIATED WITH THE CHEMICALS OF CONCERN FOR OU5 ARE SHOWN BELOW:

ARSENIC

ARSENIC IS ASSOCIATED WITH AN INCREASED INCIDENCE OF LUNG, LIVER, BLADDER, AND SKIN CANCER IN INDIVIDUALS EXPOSED VIA DRINKING WATER AND WITH AN INCREASED INCIDENCE OF LUNG CANCER IN OCCUPATIONALLY EXPOSED WORKERS. EPA HAS CLASSIFIED ARSENIC IN GROUP A--HUMAN CARCINOGEN.

ACUTE EFFECTS OF ARSENIC ARE GENERALLY SEEN ONLY FOLLOWING A LARGE DOSE. ACUTE ARSENIC POISONING DUE TO INGESTION IS MANIFESTED IN GASTROINTESTINAL DISTURBANCES. THE INTENSITY AND ONSET OF SYMPTOMS IS DETERMINED BY THE PHYSICAL FORM, PURITY AND TIME SINCE LAST EATEN. SYMPTOMS OF ACUTE POISONING ARE TIGHTNESS OF THE THROAT, DIFFICULTY IN SWALLOWING, AND VIOLENT ABDOMINAL PAIN. ARSENIC CONSUMPTION CAN ALSO LEAD TO SEVERE HIGH BLOOD PRESSURE AND WIDESPREAD DAMAGE TO THE CENTRAL NERVOUS SYSTEM (CNS). DEATH MAY RESULT FROM CARDIAC FAILURE. IN LESS SEVERE CASES OF OCCUPATIONAL EXPOSURE, RECOVERY OFTEN OCCURS AND MAY BE COMPLETE OR SHOW SIGNS OF CHRONIC POISONING. LETHAL DOSES OF ARSENIC RANGE BETWEEN 70 AND 180 UG. CHRONIC AND SUBCHRONIC EXPOSURES TO ARSENIC GENERALLY AFFECT MANY OF THE SAME ORGAN SYSTEMS AS THOSE AFFECTED BY ACUTE EXPOSURE. IN MOST CASES, EFFECTS CAN BE SEEN ONLY AFTER CHRONIC LOW DOSE EXPOSURE. THE SKIN IS ONE OF THE PRIME TARGETS OF CHRONIC EXPOSURES.

CHROMIUM

CHROMIUM IS AN ESSENTIAL MICRONUTRIENT AND IS NOT TOXIC IN TRACE QUANTITIES. HIGH LEVELS OF SOLUBLE CHROMIUM(VI) AND CHROMIUM(III) PRODUCE KIDNEY AND LIVER DAMAGE. CHROMIUM IS TRANSPORTED ACROSS THE PLACENTA AND CONCENTRATED IN THE FETUS. CHRONIC INHALATION EXPOSURE MAY LEAD TO RESPIRATORY DAMAGE. OCCUPATIONAL EXPOSURES TO CHROMIUM COMPOUNDS CAUSE SEVERE SKIN PROBLEMS AND INFLAMMATION OF THE LARYNX AND LIVER. EPA HAS CLASSIFIED CHROMIUM(VI) IN GROUP A - HUMAN CARCINOGEN BASED ON EPIDEMIOLOGICAL STUDIES OF WORKERS EXPOSED TO CHROMIUM(VI) VIA INHALATION.

PESTICIDES

ALL THE PESTICIDES AT THE SAND CREEK OPERABLE UNIT NO. 5 CAN BE CLASSIFIED AS CHLORINATED HYDROCARBONS. THE ENVIRONMENTAL AND BIOLOGICAL PERSISTENCE OF CHLORINATED HYDROCARBON PESTICIDES PRESENTS THE SPECIAL PROBLEM OF CHRONIC MAMMALIAN TOXICITY RESULTING FROM

REPEATED LOW-LEVEL EXPOSURE TO THESE COMPOUNDS.

CHLORDANE

CHLORDANE HAS BEEN USED FOR CONTROL OF INSECTS AND AGRICULTURAL USE. IN RECENT YEARS, IT HAS BEEN EXTENSIVELY USED TO CONTROL HOUSEHOLD PESTS AND FOR CERTAIN INSECTS. THE PRINCIPAL TOXIC EFFECTS IN HUMANS FOLLOWING ACUTE AND CHRONIC EXPOSURES TO CHLORDANE INCLUDE CENTRAL NERVOUS SYSTEM EXCITATION, IMMUNE SYSTEM DEFICIENCIES AND BLOOD DISORDERS. CHLORDANE HAS NOT BEEN A COMMON CAUSE OF POISONING. ALL ESTABLISHED CASES HAVE BEEN ASSOCIATED WITH GROSS EXPOSURES. IN MOST INSTANCES, INCLUDING THOSE WITH FULLY RECOVERY, CONVULSIONS APPEARED WITHIN 0.5 TO 3.0 HOURS AFTER CONSUMPTION OR AFTER DERMAL EXPOSURE. FOLLOWING INGESTION, SOME PEOPLE EXPERIENCED NAUSEA AND VOMITING BEFORE SIGNS OF CENTRAL NERVOUS SYSTEM OVER-ACTIVITY. EPA'S CARCINOGEN ASSESSMENT GROUP (CAG) HAS CLASSIFIED CHLORDANE IN GROUP B2 -- PROBABLE HUMAN CARCINOGEN.

4,4'-DDT

4,4'-DDT HAS BEEN SHOWN TO BE CARCINOGENIC TO MICE, PRIMARILY CAUSING LIVER TUMORS, BUT ALSO CAUSING LUNG TUMORS AND LYMPHOMAS. 4,4'-DDT IS ALSO A REPRODUCTIVE TOXIN, CAUSING REDUCED LITER SIZE, REDUCED GROWTH OF OFFSPRINGS, AND FETAL DEATH. CHRONIC EXPOSURE CAUSES ADVERSE EFFECTS TO THE LIVER AND CENTRAL NERVOUS SYSTEM. ACUTE EXPOSURE TO LARGE DOSES OR CHRONIC EXPOSURE TO LOWER DOSES MAY CAUSE SEIZURES. 4,4'-DDT IS BIOCONCENTRATED AND STORED IN THE FAT TISSUE OF MOST ANIMALS. IN STUDIES OF WORKERS OCCUPATIONALLY EXPOSED TO 4,4'-DDT BY INHALATION, NO INCREASED INCIDENCE OF CANCER WAS REPORTED (ORTELEE 1958, LAWS ET AL. 1967).

EXPERIMENTAL AND ACCIDENTAL EXPOSURES HAVE REVEALED THAT A SINGLE DOSE OF 10 MG/KG PRODUCES ILLNESS CHARACTERIZED BY VOMITING, HEADACHE, AND CONFUSION. ACUTE POISONINGS CAUSE A SLIGHT DECREASE IN RED BLOOD CELLS AND OBVIOUS NEUROLOGICAL EFFECTS. 4,4'-DDT HAS BEEN CLASSIFIED BY EPA'S CARCINOGEN ASSESSMENT GROUP (CAG) IN GROUP B2--PROBABLE HUMAN CARCINOGEN.

2,4-DICHLOROPHENOXYACETIC ACID

2,4-D IS NOT BELIEVED TO CAUSE CANCER, BUT HAS BEEN SHOWN TO PRODUCE WEAK MUTAGENIC EFFECTS IN CULTURED CELLS, AND TO CAUSE BIRTH DEFECTS IN RATS, MICE, AND HAMSTERS. CONSIDERABLE UNCERTAINTY EXISTS REGARDING THE TOXICITY OF 2,4-D TO HUMAN; THE MINIMAL TOXIC CASE MAY BE AS LOW AS 80 MG/KG, WITH AN AVERAGE ORAL DOSE LIKELY TO BE FATAL ESTIMATED TO BE 400 MG/KG. BASED ON CLINICAL DATA, POISONING CAN OCCUR FOLLOWING DERMAL EXPOSURE OR CONSUMPTION. THE PRINCIPLE ACUTE SYMPTOMS ARE VOMITING, FEVER, DIARRHEA, AND PROFOUND MUSCLE WEAKNESS. PATHOLOGICAL CHANGES HAVE ALSO OCCURRED IN THE GASTROINTESTINAL TRACT, LIVER, LUNGS, AND KIDNEYS. NO KNOWN CHRONIC HUMAN HEALTH EFFECTS EXIST.

DIELDRIN

DIELDRIN CAN BE ABSORBED BY HUMANS FROM THE GASTROINTESTINAL TRACT FOLLOWING INGESTION OF THE PESTICIDE, AND ABSORBED THROUGH THE SKIN FOLLOWING SKIN EXPOSURE. DIELDRIN AFFECTS THE CENTRAL NERVOUS SYSTEM, PRODUCING INCOORDINATION, HEADACHE, GASTROINTESTINAL DISTURBANCES, AND CONVULSIONS. EPA HAS CLASSIFIED DIELDRIN IN GROUP B2 -PROBABLY HUMAN CARCINOGEN.

HEPTACHLOR

THE HUMAN TOXIC EFFECTS OF HEPTACHLOR HAVE NOT BEEN WELL DOCUMENTED. ANIMAL STUDIES INDICATE THAT HEPTACHLOR CAUSES THE SAME KIND OF ILLNESS AS THAT PRODUCED BY SIMILAR PESTICIDES SUCH AS CHLORDANE. IT HAS ALSO

BEEN SHOWN TO CAUSE CHROMOSOMAL MUTATIONS. HOWEVER, NO LETHAL GENETIC CHANGES WERE PRODUCED WHEN MALE MICE RECEIVED LARGE DOSES OF THE PESTICIDE. THE DELETERIOUS EFFECTS OF CHROMOSOMAL CHANGES IN HUMANS IN INCONCLUSIVE. EPA'S CARCINOGEN ASSESSMENT GROUP HAS CLASSIFIED HEPTACHLOR IN GROUP B2--PROBABLE HUMAN CARCINOGEN.

EXPOSED POPULATION AND SITE RISK

THE SAND CREEK SITE IS HIGHLY INDUSTRIALIZED. THE DAY USE POPULATION MAY REACH SEVERAL HUNDRED. THE CITY OF COMMERCE CITY HAS PROJECTED FUTURE LAND USE FOR THE AREA AS INDUSTRIAL. THEREFORE, THE MAXIMUM REASONABLE EXPOSURE SCENARIO FOR THE SITE IS CONSIDERED TO BE FOR THE INDUSTRIAL WORKER. THE RISK TO THE INDUSTRIAL WORKER WAS CALCULATED FOR EACH EXPOSURE PATHWAY, INHALATION, INGESTION AND DERMAL. THE INGESTION PATHWAY WAS CONSIDERED TO PRESENT THE GREATEST RISK. TABLE 7 SHOWS A COMPARISON OF THE (10-6) ACTION LEVELS TO THE MAXIMUM AND AVERAGE CONCENTRATIONS FOUND AT THE SITE.

THE EXPOSURE SCENARIOS PRESENTING THE HIGHEST RISK AT OU5 IS INCIDENTAL INGESTION OF PESTICIDE (HOC) CONTAMINATED SOILS. OTHER EXPOSURE SCENARIOS FOR THE SITE (INHALATION OF CONTAMINATED DUST AND INHALATION OF COMPOUNDS VOLATILIZING FROM THE SOIL) GENERALLY PRESENT LOWER RISKS.

TWO CHEMICALS OF CONCERN, DIELDRIN AND HEPTACHLOR, WERE CHOSEN AS DRIVER COMPOUNDS FOR OU5 REMEDIATION DUE TO THEIR CARCINOGENICITY AND CONCENTRATIONS PRESENT AT THE SITE. IF ONLY THESE TWO COMPOUNDS WERE TO BE REMOVED FROM THE TARGETED SURFICIAL SOILS, A 2.7 X (10-5) CARCINOGENIC RISK (INGESTION PATHWAY) WOULD REMAIN ON-SITE FOR INDUSTRIAL WORKERS. WHILE THIS IS WITHIN THE ACCEPTABLE RISK RANGE, IT IS IMPORTANT TO NOTE THAT THE SOILS EXCEEDING DIELDRIN AND HEPTACHLOR REMEDIATION GOALS LARGELY INCLUDE THE EXTENT OF CONTAMINATION FROM OTHER IDENTIFIED CARCINOGENIC CHEMICALS OF CONCERN (4,4'DDT, CHLORDANE, ARSENIC, AND CHROMIUM CONCENTRATIONS DID NOT PRESENT A SITE RISK OUTSIDE OF THE ACCEPTABLE (10-4) - (10-6) RANGE. THEREFORE, THE REMEDIATION ALTERNATIVE SELECTED IN THIS ROD WILL RESULT IN THE REMOVAL OR REDUCTION IN CONCENTRATION OF THESE CHEMICALS OF CONCERN TO BELOW THE 2.7 X (10-5) CARCINOGENIC RISK FOR INDUSTRIAL WORKERS.

#DA
VII. DESCRIPTION OF ALTERNATIVES

THE DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES, PRESENTED IN THE FEASIBILITY STUDY FOR OU5, RESULTED IN THE DEVELOPMENT OF FOUR ALTERNATIVES FOR SITE REMEDIATION. THESE ALTERNATIVES ARE SUMMARIZED BELOW.

ALTERNATIVE NO. 1 - NO ACTION

THE NO ACTION ALTERNATIVE IS PRESENTED AS A BASIS FOR COMPARISON WITH THE OTHER ALTERNATIVES. UNDER NO ACTION, SOIL WOULD REMAIN CONTAMINATED WITH TOXIC CHEMICALS AND THE RISKS DESCRIBED ABOVE WOULD REMAIN. NO ACTION COULD BE CONSIDERED FEASIBLE ONLY IF THE OTHER ALTERNATIVES COULD NOT SUBSTANTIALLY REDUCE TOXICITY, MOBILITY, VOLUME, OR THE HEALTH RISK ASSOCIATED WITH THE SITE. SELECTION OF THE NO ACTION ALTERNATIVE WOULD REQUIRE MONITORING OF GROUNDWATER FOR THIRTY YEARS TO EVALUATE MOVEMENT OF CONTAMINANTS FROM THE SITE. THE PUBLIC HEALTH EVALUATION (PHE) WOULD BE PERFORMED AT 5-YEAR INTERVALS AS IS REQUIRED UNDER CERCLA/SARA WHEN CONTAMINATED MATERIAL IS LEFT ON SITE. OPERATION AND MAINTENANCE COSTS OF APPROXIMATELY 20,000 PER YEAR ARE PROJECTED FOR PERIODIC SAMPLING INSPECTION, AND PERFORMING THE PHE. ASSUMING A MONITORING PERIOD OF 30 YEARS THIS EQUATES TO A PRESENT WORTH COST OF $604,000.

TABLE 7

CHEMICALS OF CONCERN, MAXIMUM AND AVERAGE SOIL CONCENTRATIONS, AND HEALTH BASED ACTION LEVELS FOR OU5

CHEMICALS OF CONCERN	MAXIMUM CONCENTRATION PPM	AVERAGE CONCENTRATION PPM
ARSENIC	1170	18.04
CHROMIUM	66	55.64
DIELDRIN	343	3.95
HEPTACHLOR	76	3.70
CHLORDANE	355	20.94
2-4 D	15,000	1.16
44 DDT	203	89.24

CHEMICALS OF CONCERN	ACTION LEVELS BASED ON CARCINOGENIC RISK PPM
ARSENIC	
CHROMIUM	
DIELDRIN	0.155
HEPTACHLOR	0.553
CHLORDANE	
2-4 D	
44 DDT	

ACTION LEVELS FOR (10-6) RISK.

BY REMEDIATING THE SOILS TO THE CARCINOGENIC RISK LEVELS FOR DIELDRIN AND HEPTACHLOR, THE OVERALL SITE RISK IS LOWERED TO THE ACCEPTABLE RISK RANGE OF (10-4) - (10-6).

ALTERNATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

ALTERNATIVE NO. 2 WOULD INVOLVE REDUCING THE AREAL EXTENT OF CONTAMINATED SOIL BY EXCAVATING APPROXIMATELY 140,000 CY OF THE SURFACE SOIL CONTAMINATED ABOVE INDUSTRIAL USE ACTION LEVELS LISTED IN TABLE 7, PLACING THE EXCAVATED SOIL IN A DESIGNATED AREA OF CONTAMINATION, AND CONSTRUCTING A CAP OVER THE ENTIRE CONTAMINATED AREA. THE CAP, CONSTRUCTED OF A THREE-LAYER DESIGN TO COMPLY WITH RCRA REQUIREMENTS, WOULD PREVENT DIRECT CONTACT WITH CONTAMINATED SOIL, MINIMIZE AIRBORNE EMISSIONS, AND MINIMIZE SURFACE INFILTRATION (THEREBY PROTECTING GROUNDWATER RESOURCES). ALTERNATIVE NO. 2 WOULD BE CONSIDERED ON-SITE CONTAINMENT.

LAND USE RESTRICTIONS WOULD BE REQUIRED TO ENSURE LONG-TERM MAINTENANCE OF THE CAP AND TO PREVENT ACTIVITIES THAT WOULD DISTURB THE CAP OR RESULT IN CONTACT WITH OR RELEASE OF CONTAMINATED SOIL. THE LONG-TERM EFFECTIVENESS OR PERMANENCE IS QUESTIONABLE BECAUSE CONTAINMENT DOES NOT PERMANENTLY ADDRESS THE CONTAMINATION AND THE CAP MAY ULTIMATELY FAIL. ALSO, BECAUSE NO TREATMENT WOULD OCCUR, TOXICITY AND VOLUME OF CONTAMINANTS WOULD NOT BE REDUCED. BECAUSE CONTAMINANTS ARE LEFT ON-SITE, MONITORING OF GROUNDWATER WOULD BE REQUIRED FOR THIRTY YEARS, AND RE-EVALUATION OF THE PHE WOULD BE PERFORMED AT 5-YEAR INTERVALS. LAND USE WOULD BE RESTRICTED TO INDUSTRIAL USE. INSTITUTIONAL CONTROLS WOULD BE IMPLEMENTED TO MAINTAIN THE INTEGRITY OF THE CAP. WITHOUT RESTRICTING THE LAND USE OF THE CAPPED AREA IT IS HIGHLY LIKELY THE CAP WOULD FAIL. RESTRICTION OF ON-SITE DIGGING AND WELL INSTALLATION WOULD BE PROBABLE INSTITUTIONAL CONTROLS REQUIRED TO MAINTAIN THE CAP. THE ESTIMATED PRESENT WORTH COST TO CONSTRUCT A CAP AT OU5 IS APPROXIMATELY 2,547,170. THE ESTIMATED COST FOR MAINTENANCE OF THE CAP IS $70,000/YR.

ALTERNATIVE NO. 3 - OFF-SITE LANDFILL DISPOSAL

ALTERNATIVE NO. 3 INVOLVES EXCAVATION OF APPROXIMATELY 14,000 CY OF THE CONTAMINATED SOIL WITH CONCENTRATIONS ABOVE ACTION LEVELS IDENTIFIED IN TABLE 7, TRANSPORT AND DISPOSAL AT AN OFF-SITE HAZARDOUS WASTE LANDFILL, BACKFILLING THE EXCAVATED AREA WITH CLEAN SOIL AND REVEGETATION OF THE SITE. MOBILITY OF CONTAMINANTS WOULD BE REDUCED THROUGH OFF-SITE CONTAINMENT. LONG-TERM EFFECTIVENESS IS CONSIDERED TO BE HIGH. A PHE WOULD BE REQUIRED EVERY 5 YEARS BASED ON CERCLA SECTION 121(C). THE ESTIMATED PRESENT WORTH COST FOR ALTERNATIVE NO. 3 IS $4,903,000. ANNUAL O & M COSTS OF $67,000 ARE EXPECTED FOR SHORT-TERM MONITORING DURING REMEDIATION ACTIVITIES.

ALTERNATIVE NO. 3 WAS ORIGINALLY PROPOSED AS A CONTINGENCY REMEDY TO AUGMENT THE PREFERRED REMEDY, WHICH IS AN INNOVATIVE TECHNOLOGY, AND IN THE EVENT THAT THE PILOT TEST FOR THE SELECTED REMEDY (ALTERNATIVE NO. 4) DEMONSTRATES THAT FIELD SCALE SOIL WASHING IS NOT SUCCESSFUL. HOWEVER, SINCE THE DEVELOPMENT OF THE FS AND PROPOSED PLAN, ADDITIONAL REQUIREMENTS REGARDING THE APPLICATION OF LAND DISPOSAL RESTRICTIONS TO ALTERNATIVE NUMBERS 3 AND 4 BECAME APPARENT. THIS INFORMATION INDICATES THAT OFF-SITE DISPOSAL OF SOILS IN A HAZARDOUS WASTE LANDFILL CANNOT OCCUR WITHOUT TREATMENT PRIOR TO DISPOSAL. THE REQUIRED TREATMENT FOR SOILS WITH MOST OF THE CONTAMINANTS FOUND AT OU5 IS INCINERATION, WHICH IS THE BDAT FOR MOST CONTAMINANTS IN THE SOILS. ROUGH ESTIMATES FOR INCINERATION ARE CURRENTLY $1,000 PER CUBIC YARD OF SOIL. THIS WOULD RAISE THE COST OF ALTERNATIVE NO. 3 BY APPROXIMATELY $14,000,000. THE TOTAL COST OF ALTERATIVE NO. 3 WOULD BE APPROXIMATELY $22,000,000. EPA DECIDED TO DROP ALTERNATIVE NO. 3 AS A CONTINGENCY TO THE SELECTED REMEDY AT THIS TIME, BASED UPON CONFIDENCE IN THE SELECTED REMEDY AND

THE DIFFERENCE IN COSTS RESULTING FROM THE DIFFERENT SOIL VOLUMES TO BE INCINERATED.

ALTERNATIVE NO. 4 - ON-SITE SOIL WASHING TREATMENT OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASHING RESIDUALS

ALTERNATIVE NO. 4, INVOLVES EXCAVATION AND TREATMENT ON SITE BY SOIL WASHING OF APPROXIMATELY 14,000 CY OF SURFACE SOIL WITH CONCENTRATIONS ABOVE HEALTH RISK-BASED INDUSTRIAL ACTION LEVELS LISTED IN TABLE 7. EXCAVATED AREAS WOULD BE BACKFILLED WITH TREATED SOIL, AND REVEGETATED. THE CONTAMINATED LIQUIDS GENERATED DURING SOIL WASHING WOULD BE TREATED OFF-SITE IN ACCORDANCE WITH LAND DISPOSAL RESTRICTIONS (LDRS) WITH RESIDUALS DISPOSED OF IN A SUBTITLE C LANDFILL.

SOIL WASHING TREATMENT OF HAZARDOUS SUBSTANCES IS AN INNOVATIVE TECHNOLOGY. THEREFORE, BENCH SCALE TREATABILITY TESTS WERE PERFORMED TO EVALUATE THE EFFECTIVENESS OF THE PROCESS AND AID IN DESIGNING THE TREATMENT SYSTEM. TOXICITY AND VOLUME OF THE CONTAMINATED SOILS WOULD BE REDUCED THROUGH TREATMENT (SOIL WASHING) AND DESTRUCTION (INCINERATION OF LIQUIDS AND RESIDUAL SOILS). THIS ALTERNATIVE OFFERS A PERMANENT SOLUTION FOR THE SITE. GROUNDWATER MONITORING WOULD BE REQUIRED FOR 30 YEARS FOLLOWING COMPLETION, AND THE PHE WOULD BE RE-EVALUATED AFTER 5 YEARS. AFTER ADDITIONAL FIELD TESTING AND DESIGN ALTERNATIVE NO. 4 WOULD TAKE APPROXIMATELY 9-12 MONTHS TO IMPLEMENT AND 2-3 YEARS TO COMPLETE. THE ESTIMATED PRESENT WORTH COST IS $4,490,734. ANNUAL OPERATION AND MAINTENANCE COSTS ARE EXPECTED TO BE $20,000 PER YEAR. THIS ALTERNATIVE WILL COMPLY WITH THE LDRS THROUGH A TREATABILITY VARIANCE FOR THE CONTAMINATED SOIL AND DEBRIS.

#SCAA
VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THIS SECTION PRESENTS A COMPARISON OF ALTERNATIVES USING NINE COMPONENT CRITERIA. THESE CRITERIA, ARE SET FORTH IN OSWER DIRECTIVE 9355.3-02 AND THE NCP (40 CFR 430(E)(9)(III).

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT
2. COMPLIANCE WITH ARARS
3. LONG-TERM EFFECTIVENESS AND PERMANENCE
4. REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT
5. SHORT-TERM EFFECTIVENESS
6. IMPLEMENTABILITY
7. COST
8. STATE ACCEPTANCE
9. COMMUNITY ACCEPTANCE

CRITERION 1: PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

ALTERNATIVE NO. 1 - NO ACTION

UNDER THE NO ACTION ALTERNATIVE, NO REMEDIATION WOULD TAKE PLACE AND RISK TO PUBLIC HEALTH AND THE ENVIRONMENT WOULD NOT BE REDUCED, ELIMINATED, OR CONTROLLED. TOXICITY, MOBILITY, AND VOLUME OF CONTAMINANTS WOULD BE UNCHANGED. THIRTY-YEAR MONITORING OF GROUND WATER WOULD BE REQUIRED. RE-EVALUATION OF THE PHE AT 5-YEAR INTERVALS WOULD BE NECESSARY BECAUSE MATERIAL CONTAMINATED ABOVE HEALTH BASED ACTION LEVELS WOULD BE LEFT ON SITE.

ALTERNATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

THE CAP WOULD PROTECT HUMAN HEALTH TO THE EXTENT THAT IT ELIMINATES EXPOSURE VIA DERMAL CONTACT, INGESTION, AND INHALATION. IT WOULD ALSO

REDUCE THE POTENTIAL FOR LEACHING OF CONTAMINANTS INTO GROUND WATER. BECAUSE CONTAMINANTS WOULD BE LEFT ON-SITE, REEVALUATION OF THE PHE WOULD BE REQUIRED AT 5-YEAR INTERVALS TO EVALUATE THE CONTINUED EFFECTIVENESS OF THE CAP, ASSESS THE REMAINING RISKS AND DEVELOP NECESSARY CORRECTIVE ACTIONS TO REDUCE THE RISK IF WARRANTED.

ALTERNATIVE NO. 3 - OFF-SITE DISPOSAL OF SOILS

ALTERNATIVE NO. 3 PROVIDES A HIGH DEGREE OF PROTECTIVENESS OF HUMAN HEALTH AND THE ENVIRONMENT. CONTAMINATED SOILS WOULD BE EXCAVATED AND REMOVED FROM THE SITE, ELIMINATING THE HEALTH THREAT THAT THE CONTAMINATED SOILS PRESENTLY POSE THROUGH DIRECT CONTACT AND POTENTIAL MIGRATION TO GROUND WATER. A PORTION OF THE RISK WOULD BE TRANSFERRED TO AN OFF-SITE LANDFILL THAT IS DESIGNED AND MANAGED TO CONTAIN THE CONTAMINANTS.

ALTERNATIVE NO. 4 - ON-SITE WASHING TREATMENT OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS

ALTERNATIVE NO. 4, THE SOIL WASHING ALTERNATIVE, PROVIDES A HIGH DEGREE OF PROTECTIVENESS TO HUMAN HEALTH AND THE ENVIRONMENT. THE CONTAMINATED SOIL WOULD BE EXCAVATED AND TREATED ON-SITE WITH A SOIL WASHING PROCESS. ONCE SOILS ARE TREATED TO ACCEPTABLE HEALTH RISK-BASED ACTION LEVELS, THEY WOULD BE BACKFILLED AND THE SITE REVEGETATED. RESIDUALS FROM THE SOIL WASHING PROCESS WOULD BE INCINERATED OFF-SITE AND DISPOSED OF IN A RCRA SUBTITLE C LANDFILL. THIS ALTERNATIVE WOULD REDUCE THE HEALTH THREAT POSED BY DIRECT CONTACT TO LEVELS WHICH WOULD SAFELY ALLOW REUSE OF THE OU5 AREA AS AN INDUSTRIAL AREA.

CRITERION 2: COMPLIANCE WITH ARARS

CERCLA SECTION 121 REQUIRES SELECTION OF A REMEDIAL ACTION THAT IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THE DETERMINATION OF PROTECTIVENESS IS BASED ON COMPLIANCE OF THE SELECTED REMEDY WITH ARARS AND/OR HEALTH-BASED ACTION LEVELS.

APPLICABLE REQUIREMENTS ARE THOSE CLEANUP STANDARDS, STANDARDS OF CONTROL, AND OTHER SUBSTANTIVE ENVIRONMENTAL PROTECTION REQUIREMENTS, CRITERIA, OR LIMITATIONS PROMULGATED UNDER FEDERAL OR STATE LAW THAT SPECIFICALLY ADDRESS A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION, LOCATION, OR OTHER CIRCUMSTANCE AT A CERCLA SITE.

RELEVANT AND APPROPRIATE REQUIREMENTS ARE THOSE CLEANUP STANDARDS, STANDARDS OF CONTROL, AND OTHER SUBSTANTIVE ENVIRONMENTAL PROTECTION REQUIREMENTS, CRITERIA, OR LIMITATIONS PROMULGATED UNDER FEDERAL OR STATE LAW THAT, WHILE NOT "APPLICABLE" TO A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION, LOCATION, OR OTHER CIRCUMSTANCE AT A CERCLA SITE, ADDRESS PROBLEMS OR SITUATIONS SUFFICIENTLY SIMILAR TO THOSE ENCOUNTERED AT THE CERCLA SITE THAT THEIR USE IS WELL SUITED TO THE PARTICULAR SITE.

THE ARARS FOR THE ALTERNATIVES DESCRIBED ABOVE ARE SET FORTH IN APPENDIX A. THE TABLES OF ARARS IN THE APPENDIX PRESENT THE FEDERAL AND STATE CHEMICAL, LOCATION AND ACTION SPECIFIC ARARS AND THOSE REGULATIONS TO BE CONSIDERED AS THEY APPLY TO THE ALTERNATIVES 1-4.

ALTERNATIVE NO. 1 - NO ACTION

THE NO ACTION ALTERNATIVE AT OU5 DOES NOT ATTAIN ARARS, CLEANUP GOALS, OR OTHER HUMAN HEALTH AND THE ENVIRONMENT PROTECTION REQUIREMENT.

ALTERNATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

CAPPING COULD BE PERFORMED IN COMPLIANCE WITH ARARS. ARARS INCLUDE OSHA WORKER PROTECTION REGULATIONS, AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE AND VAPOR EMISSIONS AND COLORADO NOISE ABATEMENT STANDARDS. THE CAP WOULD BE CONSTRUCTED TO COMPLY WITH SUBSTANTIVE AND TECHNICAL REQUIREMENTS OF RCRA. DURING CAP CONSTRUCTION FEDERAL CLEAN AIR ACT NATIONAL AIR QUALITY STANDARDS AND STATE OF COLORADO AIR QUALITY REGULATIONS NECESSITATE THE CONTROL OF VAPOR AND PARTICULATE EMISSIONS.

ALTERNATIVE NO. 3 - OFF-SITE LANDFILL DISPOSAL OF SOILS

ALL ARARS PERTAINING TO ALTERNATIVE NO. 3 CAN BE ATTAINED. ARARS INCLUDE LDRS FOR OFF-SITE TREATMENT AND DISPOSAL, OSHA WORKER PROTECTION REGULATIONS, PARTICULATE AND VAPOR EMISSION REGULATIONS, RCRA REGULATIONS, INCLUDING LDR, AND THE RULES AND REGULATIONS GOVERNING THE TRANSPORTATION OF HAZARDOUS MATERIALS WITHIN COLORADO. FEDERAL CLEAN AIR ACT NATIONAL AIR QUALITY STANDARDS AND STATE OF COLORADO AIR QUALITY REGULATIONS NECESSITATE THE CONTROL OF VAPOR AND PARTICULATE EMISSIONS.

ALTERNATIVE NO. 4 - ON-SITE WASHING TREATMENT OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS

THE ARARS ASSOCIATED WITH THE SOIL WASHING ALTERNATIVE PERTAIN TO EXCAVATION, STOCKPILING, DEMOLITION, SOIL WASHING, AND BACKFILLING ACTIVITIES FOR ON-SITE OPERATIONS, AND HAZARDOUS WASTE TRANSPORT, INCINERATION EMISSIONS AND LDRS FOR ON-SITE AND OFF-SITE ACTIVITIES. DURING ON-SITE ACTIVITIES, DUST GENERATION, EXCAVATION AND INCINERATION NOISE, AND VAPOR EMISSIONS WOULD BE OF CONCERN. WORKERS WOULD HAVE TO FOLLOW OSHA HEALTH AND SAFETY REGULATIONS DURING ALL PHASES OF REMEDIAL ACTION. FEDERAL CLEAN AIR ACT NATIONAL AIR QUALITY STANDARDS AND STATE OF COLORADO AIR QUALITY REGULATIONS NECESSITATE THE CONTROL OF VAPOR AND PARTICULATE EMISSIONS. THIS ALTERNATIVE WILL COMPLY WITH LDRS FOR SOIL AND DEBRIS THROUGH A TREATABILITY VARIANCE.

LDR COMPARATIVE ANALYSIS

ALTERNATIVES 2, 3, AND 4 WERE EVALUATED FOR TO APPLICATION OF THE LAND DISPOSAL RESTRICTIONS (40 CFR 268, SUBPART D) TO WHICH, GENERALLY, REQUIRE EXCAVATED SOILS TO BE TREATED USING THE "BEST DEMONSTRATED AVAILABLE TECHNOLOGY," OR BDAT, PRIOR TO BEING "PLACED" ON THE LAND OR DISPOSED OF OUTSIDE THE AREA OF CONTAMINATION.

THE NCP ADDRESSES EPA'S POLICY REGARDING THE LAND DISPOSAL RESTRICTION'S (LDR'S) TREATMENT STANDARDS AS APPLIED TO SOIL AND DEBRIS AND THEIR UTILITY AT CERCLA SITES. EPA IS OF THE BELIEF THAT TREATMENT STANDARDS DEVELOPED PURSUANT TO THE RCRA LDR PROGRAM ARE, GENERALLY, INAPPROPRIATE OR UNACHIEVABLE WHEN APPLIED TO CONTAMINATED SOIL AND DEBRIS BECAUSE BDAT TREATMENT MAY YIELD LITTLE BENEFIT OVER OTHER TREATMENT METHODS. A TREATABILITY VARIANCE TO UTILIZE A DIFFERENT TREATMENT METHOD OTHER THAN BDAT IS AVAILABLE. A FEDERAL REGISTER NOTICE DATED OCTOBER 10, 1989 (54 FR 41566) WAS ISSUED BY EPA PRIOR TO THE FINAL NCP (MARCH 8, 1990), CONCERNING THE USE OF LDR'S IN SUPERFUND SITES. THE FINAL NCP ALSO ADDRESSED THE SAME CONCERNS AND POLICY. THE CONSIDERATION OF ALTERNATIVES WAS IN CONFORMANCE WITH THIS NOTICE AND THE FINAL NCP (WHICH DEALS EXPRESSLY WITH TREATABILITY VARIANCES) AND THE NEED NOT TO UNDERTAKE A CASE BY CASE DEMONSTRATION THAT BDAT STANDARDS ARE INAPPROPRIATE. THE PRINCIPLE REASON THAT BDAT WOULD BE INAPPROPRIATE IS THE COMPLEXITY OF THE SOIL AND DEBRIS MIXTURES RESULTING IN INTERFERENCE WITH TREATABILITY.

UNDER THE NCP, TO EVALUATE THE NEED FOR THE TREATABILITY VARIANCE IT IS NECESSARY TO CONDUCT AN EVALUATION OF THE FOLLOWING FACTORS. IT IS FIRST NECESSARY TO DETERMINE IF RESTRICTED RCRA HAZARDOUS WASTES ARE PRESENT AND COMPARE THE SUPERFUND CONTAMINANTS OF CONCERN (FROM THE

BASELINE RISK ASSESSMENT) WITH BDAT CONSTITUENTS REQUIRING CONTROL SO THAT ALL CONSTITUENTS FOR WHICH REMEDIATION MAY BE REQUIRED ARE IDENTIFIED. THE NEXT CONSIDERATION IS TO EVALUATE WHETHER REMEDIAL ALTERNATIVES INVOLVE "PLACEMENT" TO DETERMINE APPLICABILITY OF THE LDR'S AND THEN WHETHER THE TREATMENT WILL ENSURE THAT THE RESPECTIVE TECHNOLOGY PROCESS WILL ATTAIN THE APPROPRIATE TREATMENT LEVELS EITHER THROUGH THE LDR TREATMENT STANDARD OR A TREATABILITY VARIANCE ALTERNATIVE TREATMENT LEVEL. IN ACCORDANCE WITH SUPERFUND GOALS, REDUCTION OF 90 PERCENT OR GREATER FOR SUPERFUND PRIMARY CONTAMINANTS OF CONCERN SHOULD BE ATTAINED. THE ALTERNATIVES PRESENTED IN THIS ROD WERE EVALUATED UNDER THIS PROCESS.

ALTERNATIVE 2 REQUIRES EXCAVATION OF SOILS AND CONSTRUCTION OF A CAP OVER THE CONTAMINATED AREA. CONSOLIDATION OF SOILS ON-SITE WOULD NOT CONSTITUTE PLACEMENT AND THUS THE LDR'S WOULD NOT BE TRIGGERED.

ALTERNATIVE 3 REQUIRES EXCAVATION AND PLACEMENT IN AN OFF-SITE HAZARDOUS WASTE LANDFILL. THE SOIL WOULD NEED TO BE TREATED ON-SITE OR OFF-SITE PRIOR TO PLACEMENT IN THE LANDFILL. BDAT FOR CONTAMINANTS IN THE SOILS INCLUDES DIFFERENT AND CONFLICTING TREATMENT TECHNOLOGIES. THEREFORE, A TREATABILITY VARIANCE WOULD BE NECESSARY..

ALTERNATIVE 4 REQUIRES EXCAVATION OF SOIL TO BE TREATED BY SOIL WASHING AND PLACEMENT OF THE CLEAN SOILS BACK TO THE PLACE FROM WHICH IT WAS EXCAVATED. IT ALSO REQUIRES THAT THE CONTAMINATED SOIL WASHING WASTEWATER RESULTING FROM THE SOIL WASHING PROCESS BE REMOVED FROM THE SITE, INCINERATED, AND PLACED IN A LANDFILL OFF-SITE. A TREATABILITY VARIANCE IS REQUIRED WHEN THE SOILS TREATED BY SOIL WASHING ARE REPLACED ON-SITE. THE RESULTING WASTE WATER WILL BE LARGELY A MIXTURE OF HIGHLY CONTAMINATED (OVER 1,000 MG/) FLUIDS, SILTS, AND CLAYS AND WILL BE TAKEN OFF-SITE FOR INCINERATION AND DISPOSAL, AS REQUIRED BY BDAT FOR CALIFORNIA LIST FLUIDS.

CRITERION 3: REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

ALTERNATIVE NO. 1 - NO ACTION

NO REDUCTION IN TOXICITY, MOBILITY, OR VOLUME WOULD BE ACHIEVED UNDER THE NO ACTION ALTERNATIVE. CONTAMINANTS WOULD CONTINUE TO MOVE FROM THE SITE, AFFECTING SURFACE WATER, GROUND WATER, AND SOILS.

ALTERNATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

THE CAPPING ALTERNATIVE WOULD NOT REDUCE TOXICITY OR VOLUME BECAUSE THE WASTE WOULD NOT BE TREATED. MOBILITY WOULD BE REDUCED TO THE EXTENT THAT THE CAP PREVENTS SURFACE WATER AND SOIL MOVEMENT FROM THE SITE AND TO THE EXTENT THAT THE CAP PREVENTS INFILTRATION OF WATER AND POTENTIAL MOVEMENT OF CONTAMINANTS TO GROUND WATER. A SIGNIFICANT REDUCTION IN MOBILITY IS EXPECTED FOR THE CAPPING ALTERNATIVE.

ALTERNATIVE NO. 3 - OFF-SITE DISPOSAL

ALTERNATIVE NO. 3 WOULD ACHIEVE A SIGNIFICANT REDUCTION IN TOXICITY, MOBILITY, AND VOLUME THROUGH TRANSFERRING SOILS TO A FACILITY DESIGNED TO CONTAIN HAZARDOUS WASTES. THE POTENTIAL FOR MOVEMENT OF CONTAMINANTS INTO GROUNDWATER BENEATH OU5 FROM THE SURFACE SOILS WOULD BE ELIMINATED.

ALTERNATIVE NO. 4 - ON-SITE WASHING TREATMENT OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS

THE SOIL WASHING ALTERNATIVE WOULD SIGNIFICANTLY REDUCE THE TOXICITY AND VOLUME AND MOBILITY OF CONTAMINANTS ON-SITE AND BY ELIMINATING THE SOURCE OF SURFACE SOIL CONTAMINANTS.

CRITERION 4: LONG-TERM EFFECTIVENESS AND PERMANENCE

ALTERNATIVE NO. 1 - NO ACTION

BECAUSE CONTAMINANTS WOULD CONTINUE TO MOVE FROM THE SITE, POSING A POTENTIAL HEALTH THREAT, THE NO ACTION ALTERNATIVE WOULD NOT PROVIDE A LONG-TERM OR PERMANENT SOLUTION. CONTINUED MONITORING OF THE SITE WOULD PROVIDE DATA ON HOW NATURAL ATTENUATION AND CHEMICAL DEGRADATION WOULD REDUCE THE THREAT TO HUMAN HEALTH AND THE ENVIRONMENT AND THE TIME PERIOD TO REDUCE THE THREAT.

ALTENATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

CAPPING IS NOT CONSIDERED A PERMANENT SOLUTION BECAUSE WASTES WOULD REMAIN UNTREATED ON SITE. LONG-TERM EFFECTIVENESS FOR PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT WOULD BE RELATED TO MAINTENANCE AND MONITORING THE EFFECTIVENESS OF THE CAP. LONG-TERM MAINTENANCE OF THE CAP COULD PROVIDE CONTROL OF CONTAMINANT MOVEMENT AND PREVENT RISK OF DIRECT CONTACT WITH CONTAMINANTS AND EXPOSURE TO AIRBORNE EMISSIONS. WITH PROPER MAINTENANCE, THE CAP WOULD BE EFFECTIVE IN PREVENTING LEACHING OF CONTAMINANTS INTO THE GROUND WATER. ALTERNATIVE NO. 3 - OFF-SITE DISPOSAL OF SOILS ALTERNATIVE NO. 3 CANNOT BE CONSIDERED A COMPLETELY PERMANENT ENVIRONMENTAL SOLUTION, BECAUSE CONTAMINANTS AND INCINERATOR RESIDUALS WOULD BE TRANSFERRED TO AN OFF-SITE FACILITY. ALTERNATIVE NO. 3 WOULD PROVIDE LONG-TERM EFFECTIVENESS FOR PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT AT THE SITE.

ALTERNATIVE NO. 4 - ON-SITE WASHING TREATMENT OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS

THIS ALTERNATIVE WOULD ACHIEVE SIGNIFICANT LONG-TERM EFFECTIVENESS AND PERMANENCE THROUGH THE SOIL WASHING PROCESS WHICH WOULD EXTRACT CHEMICALS OF CONCERN FROM LESS CONTAMINATED SOILS AND ACHIEVE ACCEPTABLE HEALTH RISK-BASED LEVELS ON-SITE. THIS WOULD PROVIDE A PERMANENT SOLUTION FOR THE SITE. OFF-SITE LANDFILLING OF ALL INCINERATED RESIDUALS WOULD EFFECTIVELY IMMOBILIZE ANY REMAINING CONTAMINANTS, AND LONG-TERM RISKS WOULD BE NEGLIGIBLE.

CRITERION 5: SHORT-TERM EFFECTIVENESS

ALTERNATIVE NO. 1 - NO ACTION

THE NO ACTION ALTERNATIVE WOULD NOT PROVIDE ANY SHORT-TERM EFFECTIVENESS.

ALTERNATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

THE SUCCESS OF ALTERNATIVE NO. 2 TO ACHIEVE SHORT-TERM EFFECTIVENESS IS RELATED TO THE DEGREE THAT PRODUCTION OF AIRBORNE PARTICULATES AND VAPOR IS CONTROLLED DURING REMEDIATION, TO MINIMIZE EXPOSURE RISK TO WORKERS AND THE SURROUNDING POPULACE. THE DEGREE OF SHORT-TERM RISKS WOULD BE LESS THAN THAT OF OTHER ALTERNATIVES DUE TO A RELATIVELY QUICK CONSTRUCTION PERIOD. AIR MONITORING DURING IMPLEMENTATION WOULD BE REQUIRED TO EVALUATE RISK AND INSTITUTE ANY CORRECTIVE ACTION.

ALTERNATIVE NO. 3 - OFF-SITE DISPOSAL OF RESIDUALS AND SOILS

EFFECTIVENESS PRESENTED BY ALTERNATIVE NO. 3 WOULD BE LESS THAN THAT OF THE NO ACTION ALTERNATIVE. IMPLEMENTATION TIME WOULD BE REDUCED BECAUSE THERE WOULD NOT BE A NEED TO CONSTRUCT A LANDFILL OR BACKFILL SOILS INTO IT. THE OFF-SITE LANDFILL WOULD HAVE THE NECESSARY FACILITIES AND POLLUTION CONTROL EQUIPMENT TO CONTAIN SOILS AND PREVENT EMISSIONS DURING TREATMENT/DISPOSAL.

ALTERNATIVE NO. 4 - ON-SITE WASHING TREATMENT OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS

REMEDIATION OF SOILS AT THE COC AREA EMPLOYING SOIL WASHING WOULD TAKE APPROXIMATELY 2-3 YEARS TO COMPLETE. WORKERS AND THE NEARBY COMMUNITY COULD POTENTIALLY BE EXPOSED TO SLIGHTLY ELEVATED RISKS DURING SOIL HANDLING AND TREATMENT ACTIVITIES. THESE RISKS, HOWEVER, CAN BE REDUCED TO ACCEPTABLE LEVELS BY INSTITUTING PROTECTIVE AND PREVENTATIVE MEASURES. A SITE-WIDE AIR MONITORING PROGRAM WOULD BE IN OPERATION DURING REMEDIAL ACTIVITIES WITH THIS ALTERNATIVE.

CRITERION 6: IMPLEMENTABILITY

ALTERNATIVE NO. 1 - NO ACTION

THE NO ACTION ALTERNATIVE IS READILY IMPLEMENTABLE.

ALTERNATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

THE CAP ALTERNATIVE IS HIGHLY IMPLEMENTABLE USING STANDARD CONSTRUCTION TECHNIQUES. THE ALTERNATIVE POSES SOME LOGISTICAL PROBLEMS ASSOCIATED WITH THE PRESENCE OF A BUILDING, RAILROAD, UNDERGROUND PIPELINE, AND OTHER UTILITIES ADJACENT TO THE SITE. DETAILED PLANNING WOULD BE REQUIRED TO ADDRESS RECONSTRUCTION OR REROUTING OF THESE RIGHTS-OF-WAY.

ALTERNATIVE NO. 3 - OFF-SITE DISPOSAL OF RESIDUALS AND SOILS

THE CONSTRUCTION ASPECTS OF ALTERNATIVE NO. 3 ARE HIGHLY IMPLEMENTABLE USING STANDARD CONSTRUCTION TECHNIQUES AND EQUIPMENT. IMPLEMENTABILITY OF LANDFILL DISPOSAL WOULD BE DEPENDENT ON THE CAPACITY OF THESE FACILITIES AT THE TIME OF REMEDIAL ACTION. THESE PROBLEMS COULD RESULT IN A DELAY IN REMEDIAL ACTION, BUT DO NOT PRECLUDE OFF-SITE DISPOSAL.

ALTERNATIVE NO. 4 - ON-SITE WASHING TREATMENT OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS

THIS ALTERNATIVE COMBINES INCINERATION, CONTAINMENT, AND SOIL WASHING TECHNOLOGIES. THE LIMITED STAGING AND OPERATIONS SPACE AT OU5 WOULD NECESSITATE A PHASED CONSTRUCTION AND TREATMENT APPROACH. OFF-SITE LAND DISPOSAL IS IMPLEMENTABLE WITH STANDARD TECHNIQUES AND EQUIPMENT, BUT IS DEPENDENT ON THE CAPACITY OF THESE FACILITIES AT THE TIME OF REMEDIAL ACTION. ALTHOUGH SOIL WASHING HAS BEEN SUCCESSFULLY DEMONSTRATED WITH CERTAIN TYPES OF COMPOUNDS, ITS EFFECTIVENESS IN TREATING THE AREA'S COMPLEX MIXTURE OF CONTAMINANTS IS UNCERTAIN. BENCH SCALE TREATABILITY TEST RESULTS OF THE OU5 SOILS INDICATES EFFECTIVE REMOVAL OF THE CONTAMINANTS IS DEPENDENT UPON THE SOIL WASHING SOLUTION CHEMISTRY TO DETERMINE IF ALL THE CONTAMINANTS CAN BE REMOVED AND TO AID IN DESIGNING THE TREATMENT SYSTEM. A PILOT TEST WOULD BE NECESSARY TO DETERMINE ACTUAL IMPLEMENTABILITY.

CRITERION 7: COST

ALTERNATIVE NO. 1 - NO ACTION

THE COST OF THE NO ACTION ALTERNATIVE IS DUE PRIMARILY TO SITE OPERATIONS AND MAINTENANCE WHICH INCLUDES PERIODIC SAMPLING, INSPECTION, GROUNDWATER MONITORING AND PERFORMANCE OF A PHE AT 5-YEAR INTERVALS. ANNUAL COST IS ESTIMATED AT $20,000 AND PRESENT WORTH COST OVER 30 YEARS IS ESTIMATED AT $604,000.

ALTERNATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

THE ESTIMATED PRESENT WORTH COST FOR CONSTRUCTION OF A CAP AT OU5 IS

APPROXIMATELY $2,547,170. THIS COST INCLUDES CONSTRUCTION, O&M, AND PERIODIC MONITORING. ANNUAL O&M COSTS ARE EXPECTED TO BE $67,000.

ALTERNATIVE NO. 3 - OFF-SITE DISPOSAL OF RESIDUALS AND SOILS

THE ESTIMATED PRESENT WORTH COST FOR ALTERNATIVE NO. 3 IS $4,903,000 PLUS APPROXIMATELY $14,000,000 TO ACCOMMODATE OFF-SITE INCINERATION PRIOR TO DISPOSAL IN ACCORDANCE WITH LDRS. THE COST ASSUMES DISPOSAL AT AN IN-STATE LANDFILL, AND THE COST MAY BE HIGHER IF TRANSPORT OUT OF STATE IS REQUIRED. ANNUAL O&M COSTS ARE EXPECTED TO BE $67,000 PER YEAR DURING REMEDIATION ACTIVITIES.

ALTERNATIVE NO. 4 - ON-SITE WASHING TREATMENT OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS

COSTS ASSOCIATED WITH THE SOIL WASHING ALTERNATIVE ARE UNCERTAIN SINCE THIS IS AN INNOVATIVE TECHNOLOGY. THE ESTIMATED PRESENT WORTH COST FOR THIS ALTERNATIVE IS $4,490,739 FOR AN INDUSTRIAL SCENARIO. ANNUAL O&M COSTS ARE EXPECTED TO BE SIMILAR TO ALTERNATIVE 3 AT APPROXIMATELY $70,000 PER YEAR.

CRITERION 8: STATE ACCEPTANCE

THE STATE HAS NOT YET CONCURRED WITH THE SELECTED REMEDY. THE STATE POSTPONES CONCURRING UNTIL COMPLETION OF ON-SITE PILOT TESTING OF SOIL WASHING. THE STATE HAS INDICATED A PREFERENCE FOR THE ALTERNATIVE IN CORRESPONDENCE WITH EPA. THE CORRESPONDENCE IS ATTACHED TO THIS ROD FOLLOWING THE RESPONSIVENESS SUMMARY.

ALTERNATIVE NO. 1 - NO ACTION

THE STATE FINDS THIS ALTERNATIVE UNACCEPTABLE DUE TO CONTINUED EXPOSURE TO THE PUBLIC, POTENTIAL CONTAMINATION OF SURFACE AND GROUNDWATER, AND LACK OF USABILITY OF THE SITE.

ALTERNATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

THE STATE IS NOT IN FAVOR OF THIS ALTERNATIVE BECAUSE THE CONTAMINATED SOIL WILL REMAIN ON-SITE AND REQUIRE LONG-TERM MAINTENANCE OF THE CAP TO ENSURE PROTECTION OF PUBLIC HEALTH AND CONTAINMENT OF THE WASTE. THE LAND USE WILL BE EXCESSIVELY RESTRICTIVE.

ALTERNATIVE NO. 3 - OFF-SITE DISPOSAL OF RESIDUALS AND SOILS

THE STATE FINDS THIS ALTERNATIVE ACCEPTABLE AS IT FULFILLS ALL THE REMEDIAL OBJECTIVES.

ALTERNATIVE NO. 4 - ON-SITE WASHING TREATMENT OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS

THIS ALTERNATIVE IS PREFERRED BY THE STATE BECAUSE IT FULFILLS ALL THE REMEDIAL OBJECTIVES AND IN ADDITION MINIMIZES WASTE. AS THE PROJECTED COST OF THIS ALTERNATIVE IS SPECULATIVE, THE STATE WILL RE-EVALUATE THIS ALTERNATIVE AS COMPARED TO ALTERNATIVE NO. 3 WHEN NEW COST FIGURES BECOME AVAILABLE.

CRITERION 9: COMMUNITY ACCEPTANCE

COMMENTS IN WRITING WERE RECEIVED FROM FOUR PARTIES, THE STATE OF COLORADO, THE CITY OF COMMERCE CITY, ONE OF THE POTENTIALLY RESPONSIBLE PARTIES, AND A TRUST SET-UP BY THE SAME PRP. THE CITY AND OTHERS WHO ATTENDED THE AUGUST 9, 1990, PUBIC MEETING WERE IN AGREEMENT WITH EPA'S PREFERRED AND CONTINGENCY REMEDY.

THE FORMER PROPERTY OWNER AND THE TRUST SET-UP BY THE FORMER PROPERTY OWNER BELIEVE THAT CAPPING WILL ADEQUATELY REMEDY THE HEALTH RISK PRESENTED BY THE SITE.

SPECIFIC COMMENTS RECEIVED BY THE EPA ARE LISTED AND RESPONDED TO IN THE RESPONSIVENESS SUMMARY (APPENDIX B).

ALTERNATIVE NO. 1 - NO ACTION

THE COMMUNITY WOULD PREFER AN ALTERNATIVE THAT REDUCES THE RISK PRESENT AT THE COC AREA.

ALTERNATIVE NO. 2 - CAPPING/INSTITUTIONAL CONTROLS

COMMUNITY ACCEPTANCE OF CAPPING IS EXPECTED TO BE GREATER THAN FOR NO ACTION BUT LESS THAN THAT FOR A TREATMENT ALTERNATIVE. HOWEVER, ONE POTENTIALLY RESPONSIBLE PARTY INDICATED THAT CAPPING WOULD BE THE LEAST EXPENSIVE METHOD OF ADDRESSING THE PROBLEM.

ALTERNATIVE NO. 3 - OFF-SITE DISPOSAL OF RESIDUALS AND SOILS

ALTERNATIVE NO. 3 WOULD BE ACCEPTABLE TO THE LOCAL COMMUNITY AND THE CITY OF COMMERCE CITY. CONTAMINANTS WOULD BE REMOVED, AND THE HEALTH THREAT WOULD BE REDUCED SUCH THAT CERTAIN USES OF THE LAND WOULD BE PERMISSIBLE.

ALTERNATIVE NO. 4 - ON-SITE WASHING TREATMENT OF REMAINING CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS

IT WAS INDICATED THAT THIS ALTERNATIVE WOULD BE PREFERRED BY THE CITY OF COMMERCE CITY SINCE CONTAMINANTS WOULD BE REMOVED, AND THE HEALTH THREAT WOULD BE REDUCED TO PERMIT INDUSTRIAL USE OF THE LAND.

#SR
IX. THE SELECTED REMEDY

BASED ON CONSIDERATION OF THE REQUIREMENTS OF CERCLA AND THE NCP, THE DETAILED EVALUATION OF THE ALTERNATIVES, A STATUTORY PREFERENCE FOR TREATMENT, AND PUBLIC COMMENTS, EPA HAS SELECTED ALTERNATIVE NO. 4 ON-SITE SOIL WASHING OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS.

SPECIFICALLY, THE SELECTED REMEDY IS COMPOSED OF THE FOLLOWING ELEMENTS:

* EXCAVATION OF SURFACE SOIL CONTAMINATED ABOVE THE ACTION LEVELS LISTED FOR THE PRIMARY CONTAMINANTS OF CONCERN IN TABLE 7.

* SOIL WASHING OF THE EXCAVATED SOILS IN AN ON-SITE TREATMENT UNIT TO THE ACTION LEVELS LISTED IN TABLE 7.

* OFF-SITE INCINERATION OF SOIL WASHING WASTEWATER.

* REPLACEMENT, GRADING, AND RE-VEGETATION OF THE AREA.

EXCAVATION OF THE APPROXIMATELY 14,000 CY OF CONTAMINATED SURFACE SOIL WILL BE ACCOMPLISHED USING STANDARD CONSTRUCTION IMPLEMENTS (BACKHOES, BULLDOZERS, ETC.). THE EXCAVATED SOIL WILL BE PLACED IN A HOPPER ON THE SOIL WASHING UNIT. THE SOIL WASHING UNIT WILL LIKELY BE MOUNTED ON FLAT-BED TRUCK TRAILERS AND BE COMPOSED OF SEVERAL WASHING AND SOIL SEPARATING UNITS. THE SOIL IS SEPARATED INTO VARIOUS SIZE PARTICLES TO SIMPLIFY THE WASHING PROCESS AND INCREASE THE OVERALL EFFICIENCY.

TYPICALLY, THE VERY FINE (SMALL) PARTICLES ARE NOT WASHED VERY EFFICIENTLY OR SEPARABLE FROM THE WASTEWATER DUE TO THEIR PHYSICAL CHARACTERISTICS AND ARE TAKEN OFF-SITE FOR INCINERATION.

THE REMAINING PRODUCTS FROM THE SOIL WASHING PROCESS ARE THE LARGER SOIL PARTICLES TREATED TO ACTION LEVELS, AND THE WASTE WATER. THE TREATED SOIL WILL THEN BE REPLACED ON-SITE AND RE-VEGETATED. THE ALTERNATIVE WOULD TAKE APPROXIMATELY 9-12 MONTHS TO IMPLEMENT AND 2-3 YEARS TO COMPLETE. THE ESTIMATED PRESENT WORTH COST IS $4,490,734. ANNUAL O&M COSTS ARE EXPECTED TO BE $20,000 PER YEAR.

BECAUSE HAZARDOUS MATERIAL MAY REMAIN ON-SITE ABOVE HEALTH BASE LEVELS FOR A LAND USE NOT ANTICIPATED, A PUBLIC HEALTH EVALUATION AND WILL BE PERFORMED EVERY 5 YEARS FOR THE PURPOSE OF REEVALUATING THE HAZARDS POSED BY THE SITE AND ASSURING THAT THE REMEDY REMAINS PROTECTIVE.

THE PUBLIC WILL LIKELY OBSERVE SOME EXCAVATION ACTIVITIES AND INCREASED TRUCK TRAFFIC NEAR 52ND AVENUE AND DAHLIA STREET UNDER THIS REMEDIAL EFFORT. THERE WILL ALSO LIKELY BE ADDITIONAL FENCING, STORAGE OF EQUIPMENT, AND SOME DECONTAMINATION ACTIVITIES (TRUCK WASHING) VISIBLE FROM DAHLIA STREET.

LAND DISPOSAL RESTRICTION TREATABILITY VARIANCE FOR THE SELECTED REMEDY

ALTERNATIVE 4 CONCERNS EXCAVATION OF SOIL TO BE TREATED BY SOIL WASHING AND PLACEMENT OF THE CLEAN SOILS BACK TO THE PLACE FROM WHICH IT WAS EXCAVATED. IT ALSO REQUIRES THAT THE CONTAMINATED SOIL WASHING WASTEWATER RESULTING FROM THE SOIL WASHING PROCESS BE REMOVED FROM THE SITE, INCINERATED, AND PLACED IN A LANDFILL OFF-SITE. A TREATABILITY VARIANCE IS REQUIRED WHEN THE SOILS TREATED BY SOIL WASHING ARE REPLACED ON-SITE. THE RESULTING WASTE WATER WILL BE LARGELY A MIXTURE OF HIGHLY CONTAMINATED (OVER 1,000 MG/L) FLUIDS, SILTS, AND CLAYS AND WILL BE TAKEN OFF-SITE FOR INCINERATION AND DISPOSAL, AS REQUIRED BY BDAT FOR CALIFORNIA LIST FLUIDS.

ALTERNATIVE 4 IS THE SELECTED REMEDY PREMISED UPON THE RESULTS OF TREATABILITY STUDIES WHICH PROVIDED TECHNICALLY SOUND REASONS TO BELIEVE SOIL WASHING WILL PERFORM EFFECTIVELY. THIS INNOVATIVE TECHNOLOGY HAS NOT BEEN TESTED ON-SITE AND TREATMENT STANDARDS ARE NOT AVAILABLE SINCE ACTUAL PERFORMANCE DATA IS NOT AVAILABLE TO INDICATE THAT LDR TREATMENT STANDARDS CAN BE MEET CONSISTENTLY FOR ALL SOILS AND DEBRIS. THOUGH IT IS BELIEVED SOIL WASHING WILL ACHIEVE REDUCTION OF CONTAMINATION TO LEVELS DEMONSTRATED ON TABLE 7, IT IS NECESSARY TO SEEK A TREATABILITY VARIANCE DUE TO THE ABSENCE OF PERFORMANCE DATA.

THE NEED FOR THE TREATABILITY VARIANCE RESULTED FROM A DETERMINATION THAT RESTRICTED RCRA WASTES WERE PRESENT ON OU5 WHICH WERE COMPARED WITH THE SUPERFUND CONSTITUENTS OF CONCERN. THE ALTERNATIVES WERE EVALUATED TO IDENTIFY IF "PLACEMENT" WOULD OCCUR TO DETERMINE IF THE TECHNOLOGY WILL ATTAIN LDR TREATMENT STANDARDS, OR IF NECESSARY, ALTERNATIVE TREATMENT LEVELS ESTABLISHED BY A TREATABILITY VARIANCE. THE PRESENCE OF RESTRICTED RCRA WASTES, THE NEED FOR PLACEMENT, AND THE DECISION TO EMPLOY SOIL WASHING RESULTED IN THE NEED FOR A TREATABILITY VARIANCE FOR THIS SELECTED ALTERNATIVE. DURING IMPLEMENTATION OF THIS REMEDY PERIODIC ANALYSIS USING THE APPROPRIATE TESTING PROCEDURE WILL BE UNDERTAKEN TO ENSURE ALTERNATE TREATMENT LEVELS FOR THE BDAT CONSTITUENTS REQUIRING CONTROL ARE BEING ATTAINED AND THUS CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT.

REMEDIATION GOALS

THE EXCAVATION OF THE CONTAMINATED SOILS ABOVE THE HEALTH BASED ACTION LEVELS LISTED IN TABLE 7 WILL BE GUIDED BY SAMPLING DURING EXCAVATION,

AND ACCOMPLISHED THROUGH THE USE OF STANDARD CONSTRUCTION EQUIPMENT. THE SOIL WILL BE TREATED TO THE TREATMENT LEVELS LISTED IN TABLE 8, WHICH REPRESENTS A COMBINATION OF HEALTH BASED ACTION LEVELS AND TREATABILITY VARIANCE ACTION LEVELS FOR THE CHEMICALS OF CONCERN, WHICH EVER IS MORE STRINGENT.

THE INTENTION OF THE REMEDIATION EFFORT IS TO RETURN THE AREA TO INDUSTRIAL USE AS PLANNED FOR BY THE CITY OF COMMERCE CITY. THIS CAN BE ACCOMPLISHED, AS DESCRIBED IN THE SUMMARY OF SITE RISK SECTION OF THIS DOCUMENT, BY EXCAVATION AND TREATMENT OF DIELDRIN AND HEPTACHLOR CONTAMINATED SOILS TO THE ACTION LEVELS LISTED IN TABLE 7 (AND REPEATED BELOW IN TABLE 8). HOWEVER, IN COMPLIANCE WITH LDRS AND THE PREAMBLE OF THE NCP WITH RESPECT TO THE USE OF TREATABILITY VARIANCES AT SUPERFUND SITES, THE TREATED SOILS CANNOT BE REPLACED ON-SITE UNTIL THE CHEMICALS OF CONCERN HAVE BEEN TREATED TO TREATABILITY VARIANCE LEVELS. HEALTH BASED ACTION LEVELS FOR DIELDRIN AND HEPTACHLOR ARE MORE STRINGENT THAN THE TREATABILITY VARIANCE LEVELS, AND WILL THEREFORE BE USED. HOWEVER, THE SOILS CONTAMINATED WITH THE REMAINING CHEMICALS OF CONCERN WILL BE TREATED TO THE TREATABILITY VARIANCE LEVELS INDICATED IN TABLE 8 PRIOR TO REPLACEMENT ON-SITE.

THE WASTEWATER RESULTING FROM THE SOIL WASHING PROCESS WILL BE A MIXTURE OF SOLVENTS, SILTS, AND FINE CLAYS, ALL CONTAMINATED ABOVE 1,000 MG/L HOCS. SINCE THIS FLUID IS A LDR "CALIFORNIA LIST" WASTE WHICH REQUIRES INCINERATION PRIOR TO DISPOSAL, THE REMEDIAL ACTION WILL BE PERFORMED ACCORDINGLY.

GROUND WATER ON-SITE WILL BE MONITORED FOR THIRTY YEARS AND A PUBLIC HEALTH EVALUATION (PHE) WILL BE PERFORMED EVERY FIVE YEARS FOLLOWING REMEDIATION. THE NET PRESENT WORTH FOR THE SELECTED REMEDY IS $4,490,000 AND IMPLEMENTATION WILL TAKE APPROXIMATELY 9-12 MONTHS.

#SD
X. STATUTORY DETERMINATIONS

EPA'S RESPONSIBILITY AT SUPERFUND SITES IS TO SELECT AND IMPLEMENT REMEDIAL ACTIONS THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. IN ADDITION, SECTION 121 OF CERCLA PROVIDES SEVERAL OTHER STATUTORY REQUIREMENTS AND PREFERENCES. THESE STATUTES SPECIFY THAT THE SELECTED REMEDIAL ACTION FOR THE SITE MUST COMPLY WITH APPLICABLE OR RELEVANT AND APPROPRIATE ENVIRONMENTAL STANDARDS ESTABLISHED UNDER FEDERAL AND STATE ENVIRONMENTAL LAWS UNLESS A WAIVER IS GRANTED. THE SELECTED REMEDY MUST ALSO BE COST EFFECTIVE AND UTILIZE PERMANENT TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. THE STATUTE ALSO CONTAINS A PREFERENCE FOR REMEDIES THAT PERMANENTLY OR SIGNIFICANTLY REDUCE THE VOLUME, TOXICITY, OR MOBILITY OF HAZARDOUS SUBSTANCES. THE FOLLOWING SECTIONS DISCUSS HOW THE SELECTED REMEDY FOR SAND CREEK OU5 MEET THESE STATUTORY REQUIREMENTS.

TABLE 8

TREATMENT LEVELS

COMPOUND	ACTION LEVEL	RATIONAL
DIELDRIN	0.155 PPM	HEALTH BASED
HEPTACHLOR	0.553 PPM	HEALTH BASED
ARSENIC	90-99 PERCENT REDUCTION	TREATABILITY VARIANCE
CHROMIUM	0.5-6.0 (TCLP)	TREATABILITY VARIANCE
CHLORDANE	90-99 PERCENT REDUCTION	TREATABILITY VARIANCE
2,4-D	90-99 PERCENT REDUCTION	TREATABILITY VARIANCE
4,4-DDT	0.5-20 (TWA)	TREATABILITY VARIANCE

1 TCLP TOXICITY CHARACTERISTIC LEACHING PROCEDURE.
2 TWA: TOTAL WASTE ANALYSIS.

1. PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THIS REMEDY WILL REDUCE THE DIRECT CONTACT THREAT CURRENTLY POSED BY SOILS AND WILL MINIMIZE THE POSSIBILITY OF FUTURE ADVERSE EFFECTS ON GROUNDWATER QUALITY BY TREATMENT OF THE MOST CONCENTRATED SOURCES OF WASTE ABOVE THE WATER TABLE AND RESTRICTING THE AREA TO INDUSTRIAL USE THROUGH INSTITUTIONAL CONTROLS. THERE ARE SOME SHORT-TERM RISKS ASSOCIATED WITH THE SELECTED REMEDY DURING SOIL HANDLING OPERATIONS, BUT THESE CAN BE MINIMIZED WITH PROTECTIVE AND PREVENTATIVE MEASURES SUCH AS DUST CONTROL MEASURES.

2. ATTAINMENT OF ARARS

REMEDIAL ACTIONS AT SAND CREEK (OU5) WILL BE UNDERTAKEN IN ACCORDANCE WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS).

ANY REGULATION, STANDARD, REQUIREMENT, CRITERION, OR LIMITATION UNDER ANY FEDERAL OR STATE ENVIRONMENTAL LAW MAY BE EITHER APPLICABLE OR RELEVANT AND APPROPRIATE TO A REMEDIAL ACTION, BUT NOT BOTH. CRITERIA, ADVISORIES AND GUIDELINES THAT ARE NOT LAW MAY BE USED TO ENSURE PROTECTIVENESS IN THE ABSENCE OF ARARS, OR WHEN ARARS ARE NOT SUFFICIENT. THESE CRITERIA, ADVISORIES, AND GUIDELINES FALL IN THE "TO BE CONSIDERED" (TBC) CATEGORY AND CAN BE USED TO ENSURE PROTECTION.

ARARS MAY BE CLASSIFIED INTO THREE GENERAL CATEGORIES:

* CHEMICAL-SPECIFIC - RELATED TO THE LEVEL OF CONTAMINATION ALLOWED FOR A SPECIFIC POLLUTANT IN VARIOUS ENVIRONMENTAL MEDIA (I.E., SOIL, WATER, AND AIR),

* LOCATION-SPECIFIC - RELATED TO THE PRESENCE OF A SPECIAL GEOGRAPHICAL (E.G., FLOODPLAIN OR WETLAND) OR ARCHEOLOGICAL AREA AT OR NEAR THE SITE, AND

* ACTION-SPECIFIC - RELATED TO A METHOD OF REMEDIAL ACTION IDENTIFIED AS AN ALTERNATIVE FOR THE SITE (E.G., DISPOSAL REQUIREMENTS OR INCINERATION STANDARDS).

THE SELECTED REMEDY OF ON-SITE SOIL WASHING OF CONTAMINATED SOIL/OFF-SITE INCINERATION AND DISPOSAL OF SOIL WASH RESIDUALS WOULD COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC REQUIREMENTS (ARARS). THE PRIMARY ARARS PERTINENT TO THE SELECTED REMEDY ARE SUMMARIZED BELOW.

* CHEMICAL-SPECIFIC ARARS

* LAND DISPOSAL RESTRICTIONS - THRESHOLD CONCENTRATIONS FOR TREATABILITY VARIANCE FOR ALTERNATIVE NO. 3.

* BDAT FOR ALL ALTERNATIVES.

* LOCATION-SPECIFIC ARARS

NONE

* ACTION-SPECIFIC ARARS

FEDERAL

* A PHE MUST BE PERFORMED AT LEAST EVERY 5 YEARS (CERCLA SS 121(C))

* OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

* THE REQUIREMENTS OF 29 USC SECTIONS 651-678, AND 29 CFR 1910.120 WHICH REGULATES WORKER HEALTH AND SAFETY, MUST BE FOLLOWED.

LAND DISPOSAL RESTRICTIONS 40 CFR 268 SUBPART D.

STATE OF COLORADO

* CRS SECTION 25-123-101, ET. SEQ. MUST BE ADHERED TO MAINTAIN COMPLIANCE WITH THE STATE OF COLORADO NOISE ABATEMENT REQUIREMENTS.

* 6 CCR 1007-3 PART 99 WILL NEED TO BE FOLLOWED. THIS REGULATION REQUIRES NOTIFICATION OF HAZARDOUS WASTE ACTIVITIES WHEN HAZARDOUS WASTE IS GENERATED.

* THE MANIFEST REQUIREMENTS OF 6 CCR 1007-3 PART 262 SUBPART B MUST BE FOLLOWED FOR OFF-SITE TRANSPORTATION OF HAZARDOUS WASTE.

* THE PRE-TRANSPORT REGULATIONS OF 6 CCR 1007-3 PART 262.30, .31 AND .33 MUST BE ADHERED TO FOR OFF-SITE TRANSPORTATION OF HAZARDOUS WASTE.

* AN EPA IDENTIFICATION NUMBER MUST BE OBTAINED FOR TRANSPORTING OF HAZARDOUS WASTE PER THE REQUIREMENTS OF 6 CCR 1007-3 PART 263.11 (A).

* CCR 1001-3 SECTION VIB WILL BE FOLLOWED TO REGULATE AIR EMISSIONS.

APPENDIX A PRESENTS THE ARARS AND TBC'S FOR SAND CREEK OU5. THE ARARS AS THEY ARE PERTINENT TO EACH OF THE FOUR ALTERNATIVES NOTED IN THE LAST COLUMN OF THE TABLE.

3. COST EFFECTIVENESS

THE SELECTED REMEDY IS COST EFFECTIVE IN MITIGATING THE RISK POSED BY CONTAMINATED SOILS IN A REASONABLE PERIOD OF TIME. TO PROVIDE FURTHER ASSURANCE THAT COST EFFECTIVENESS IS PART OF THE CHOICE OF REMEDIAL ACTION, A COST BENEFIT ANALYSIS WILL BE PERFORMED AS PART OF THE RESULTS OF THE PILOT TEST. THE SELECTED REMEDY EFFECTIVELY AND PERMANENTLY REDUCES CONTAMINATION TO ACCEPTABLE LEVELS.

4. UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

US EPA AND THE STATE OF COLORADO BELIEVE THE SELECTED REMEDY REPRESENTS THE MAXIMUM EXTENT TO WHICH PERMANENT SOLUTIONS AND TREATMENT TECHNOLOGIES CAN BE UTILIZED IN A COST-EFFECTIVE MANNER FOR THE FINAL REMEDY AT THE SAND CREEK SITE. OF THE ALTERNATIVES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND COMPLY WITH ARARS, US EPA AND THE STATE HAVE DETERMINED THAT THE SELECTED REMEDY PROVIDES THE BEST BALANCE OF TRADE OFFS IN TERMS OF LONG-TERM EFFECTIVENESS AND PERMANENT REDUCTION IN TOXICITY, MOBILITY OR VOLUME ACHIEVED THROUGH TREATMENT, SHORT-TERM EFFECTIVENESS, IMPLEMENTABILITY, COST, ALSO CONSIDERING THE STATUTORY PREFERENCE FOR THE TREATMENT AS A PRINCIPAL ELEMENT AND CONSIDERING STATE AND COMMUNITY ACCEPTANCE.

5. PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

BY WASHING THE CONTAMINATED SOIL WITH SOLVENTS AND WATER, THE SELECTED

REMEDY SATISFIES THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT OF THE PRINCIPAL THREAT WHICH PERMANENTLY AND SIGNIFICANTLY REDUCES TOXICITY, MOBILITY OR VOLUME OF HAZARDOUS SUBSTANCES AS A PRINCIPAL ELEMENT.

#RS

RESPONSIVENESS SUMMARY

SAND CREEK INDUSTRIAL SUPERFUND SITE
OPERABLE UNIT NO. 5
COMMERCE CITY, COLORADO

SEPTEMBER 1990

THIS COMMUNITY RELATIONS RESPONSIVENESS SUMMARY FOR OPERABLE UNIT NO. 5 (OU5) OF THE SAND CREEK INDUSTRIAL SITE CONTAINS THE FOLLOWING SECTIONS:

A. OVERVIEW: THE OVERVIEW BBIEFLY DESCRIBES THE SITE AND SUMMARIZES THE PUBLIC'S MAJOR COMMENTS ON EPA'S FEASIBILITY STUDY (FS) AND PREFERRED ALTERNATIVE FOR OU5.

B. SUMMARY OF COMMUNITY INVOLVEMENT: THIS SECTION GIVES A HISTORY OF EPA'S COMMUNITY RELATIONS ACTIVITIES AT THE SITE.

C. SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD: THIS SECTION CATEGORIZES ORAL AND WRITTEN COMMENTS RECEIVED CONCERNING THE FS AND EPA'S PREFERRED ALTERNATIVE, ANA PROVIDES EPA'S RESPONSES TO THOSE COMMENTS.

D. REMAINING CONCERNS: THIS SECTION DESCRIBES CONCERNS ABOUT THE FS AND TELLS HOW EPA WILL ADDRESS THEM.

E. PREVIOUS COMMUNITY RELATIONS ACTIVITIES AT THE SITE: THIS TABLE LISTS BY CHRONOLOGICAL ORDER THE COMMUNITY RELATIONS ACTIVITIES THAT HAVE OCCURRED TO DATE.

A. OVERVIEW

THE SAND CREEK INDUSTRIAL SITE IS LOCATED IN COMMERCE CITY, CITY NORTH OF DENVER, COLORADO. THE SITE AND SURROUNDING AREA ARE PRIMARILY OCCUPIED BY TRUCKING FIRMS, PETROLEUM AND CHEMICAL SUPPLY/PRODUCTION COMPANIES, WAREHOUSES, AND SMALL BUSINESSES. THERE IS A SMALL RESIDENTIAL POPULATION IN THE STUDY AREA AND THE AREA ADJACENT TO THE NORTHEAST BORDER OF THE SITE.

THE SITE CONTAINS THE FOLLOWING FOUR KNOWN POTENTIAL SOURCE AREAS, ALL OF WHICH ARE NOW INACTIVE: THE ORIENTAL REFINERY, THE COLORADO ORGANIC CHEMICAL (COC) PROPERTY, THE L.C. CORPORATION ACID PITS, AND THE 48TH AND HOLLY LANDFILL. CONTAMINANTS FOUND ON THE SITE INCLUDE PESTICIDES AND HERBICIDES, VOLATILE ORGANIC COMPOUNDS (VOCS), AND ARSENIC. TO EXPEDITE THE STUDY AND CLEANUP OF THE CONTAMINATED AREAS, EPA HAS DIVIDED THE SAND CREEK SITE INTO SIX OPERABLE UNITS. THE OPERABLE UNITS WERE ESTABLISHED BASED ON THE PRESENCE OF DIFFERENT TYPES OR CONTAMINANTS OR CONTAMINATED MEDIA, DIFFERENT SOURCE AREAS, AND/OR PHYSICAL CONSTRAINTS. THIS RESPONSIVENESS SUMMARY PRESENTS COMMENTS ON EPA'S FS AND THE PREFERRED ALTERNATIVE FOR CLEANING UP CONTAMINATED SOILS IN OPERABLE UNIT NO. 5 (OU5), WHICH CONSISTS OF THE SURFACE SOILS CONTAMINATED WITH PESTICIDES AND METALS FOUND IN THE VICINITY OF THE ADJACENT COLORADO ORGANIC CHEMICAL PLANT PROPERTY (COC), THE GALLAGHER PROPERTY (FORMER ORIENTAL REFINERY), AND THE COLORADO AND EASTERN RAILROAD PROPERTY.

COMMENTS WERE RECEIVED FROM THE CITY OF COMMERCE CITY, THE ORIGINAL OWNER OF THE COC PROPERTY, A TRUST SET UP BY THE OWNER, THE STATE OF COLORADO AND A SMALL NUMBER OF INDIVIDUALS PRESENT AT THE PUBLIC MEETING. THE MAJORITY OF THE COMMENTS WERE FOCUSED ON THE ISSUES OF PERMANENCY OF THE CLEANUP AND ANY LAND USE RESTRICTIONS.

B. SUMMARY OF COMMUNITY INVOLVEMENT

COMMUNITY RELATIONS ACTIVITIES FOR THE SAND CREEK INDUSTRIAL SITE BEGAN IN APRIL 1985, WHEN EPA DISTRIBUTED AN INTRODUCTORY FACT SHEET TO RESIDENTS, BUSINESSES, AND AGENCIES IN THE AREA. THE FACT SHEET DESCRIBED THE SITE AND EXPLAINED THEIR SUPERFUND PROCESS, WITH EMPHASIS ON THE RI/FS. FOLLOWING THE DISTRIBUTION OF THE FACT SHEET, EPA ATTENDED A PUBLIC MEETING ORGANIZED BY CITIZENS AGAINST CONTAMINATION, A LOCAL GROUP CONCERNED ABOUT THE SITE, AND COMPILED A LIST OF PEOPLE WHO OWNED PROPERTY ON THE SITE.

EPA MAILED A SECOND FACT SHEET IN NOVEMBER 1985. WRITTEN IN QUESTION-AND-ANSWER FORMAT, THIS FACT SHEET PROVIDED INFORMATION TYPICALLY REQUESTED DURING INVESTIGATION AND CLEANUP OF HAZARDOUS WASTE SITES. THAT SAME MONTH, EPA ALSO PROVIDED A REPORT ON WATER CONTAMINATION FOR A SECOND PUBLIC MEETING HELD BY THE CITIZENS AGAINST CONTAMINATION ORGANIZATION.

IN JANUARY 1986, EPA CONTACTED PROPERTY OWNERS AND COMMERCE CITY OFFICIALS TO KEEP THEM INFORMED OF ACTIVITIES AT THE SITE. IN THE SPRING, EPA PREPARED A PHOTO DISPLAY ILLUSTRATING THE RI/FS PROCESS.

A REMEDIAL INVESTIGATION REPORT DESCRIBING THE EXTENT OF CONTAMINATION WITHIN THE COC AREA WAS RELEASED FOR PUBLIC REVIEW IN MARCH 1988. IN MAY 1988, EPA CONTACTED PROPERTY OWNERS TO OBTAIN PERMISSION TO SAMPLE AND MONITOR SOILS ON THOSE PROPERTIES.

IN OCTOBER 1988, EPA MET WITH COMMERCE CITY OFFICIALS TO KEEP THEM INFORMED OF PLANS FOR THE SITE. THE COMMERCE CITY REPRESENTATIVES ALSO PROVIDED THEIR REACTIONS TO THE CLEANUP METHODS BEING CONSIDERED.

IN JANUARY 1989, THE FS WAS COMPLETED AND A REMEDIAL ALTERNATIVE WAS CHOSEN. EPA TOOK SEVERAL MEASURES TO ANNOUNCE THE CHOICE AND TO SEEK COMMENTS AND QUESTIONS FROM THE PUBLIC. FIRST, EPA MADE COPIES OF THE FS REPORT AVAILABLE TO THE PUBLIC IN THE ADAMS COUNTY PUBLIC LIBRARY, THE COLORADO DEPARTMENT OR HEALTH, AND EPA'S OWN LIBRARY IN DOWNTOWN DENVER. AT THE SAME TIME, EPA MAILED ITS THIRD FACT SHEET, WHICH DESCRIBED THE PROPOSED PLAN AS WELL AS FOUR OTHER REMEDIAL ALTERNATIVES THAT HAD BEEN EVALUATED. THIRD, EPA ANNOUNCED A PUBLIC COMMENT PERIOD DURING WHICH PEOPLE WERE INVITED TO SUBMIT COMMENTS AND QUESTIONS. THE COMMENT PERIOD ORIGINALLY RAN FROM JANUARY 13, TO FEBRUARY 13, BUT AT THE REQUEST OF SOME COMMENTATORS, EPA EXTENDED THE PERIOD TO FEBRUARY 22. FOURTH, EPA CONDUCTED A PUBLIC MEETING ON JANUARY 31 TO DESCRIBE THE RESULTS OF THE RI/FS AND ANSWER QUESTIONS FROM THE PUBLIC. EPA PUBLISHED A PRESS RELEASE AND A PUBLIC NOTICE IN EACH OF THE COMMERCE CITY NEWSPAPERS, THE COMMERCE CITY SENTINEL AND THE COMMERCE CITY BEACON, ANNOUNCING ALL OF THESE ACTIVITIES.

EPA MADE COPIES OF THE FS ADDENDUM REPORT AVAILABLE TO THE PUBLIC AND MAILED ITS FOURTH FACT SHEET DESCRIBING THE NEW PROPOSED PLAN. THE REMEDY SELECTED IN THE NEW PROPOSED PLAN INCLUDED: EXCAVATION AND OFF-SITE INCINERATION OF APPROXIMATELY 1,000 CUBIC YARDS (CY) OF HIGHLY HOC-CONTAMINATED SHALLOW (LT 5 FT) SOILS; VACUUM EXTRACTION OF THE VOLATILE ORGANIC COMPOUNDS IN THE SUBSURFACE SOILS ABOVE THE GROUNDWATER TABLE; DEMOLITION AND OFF-SITE DISPOSAL OF THE CONTAMINATED TANKS AND BUILDINGS; AND EITHER BIOREMEDIATION OR SOIL WASHING FOR THE SURFACE SOILS CONTAMINATED WITH HOCS WITH THE GOAL OF RETURNING THE SITE TO RESIDENTIAL USE. IT WAS PROPOSED THAT EXCAVATION AND OFF-SITE DISPOSAL OF THE CONTAMINATED SURFACE SOILS BE RETAINED AS A CONTINGENCY REMEDY, SINCE THE IMPLEMENTATION OF BIOREMEDIATION AND/OR SOIL WASHING DEPENDED UPON THE RESULTS OF TREATABILITY STUDIES TO BE PERFORMED SUBSEQUENT TO A RECORD OF DECISION. AN ABSENCE OF PROVEN BIOREMEDIATION AND/OR SOIL WASHING RESULTS ON SOILS CONTAMINATED WITH SIMILAR COMPOUNDS FURTHER

WARRANTED RETENTION OF THE OFF-SITE DISPOSAL OPTION.

EPA ANNOUNCED A PUBLIC COMMENT PERIOD IN EFFECT FROM JULY 19, THROUGH AUGUST 21, 1989 DURING WHICH THE PUBLIC WAS INVITED TO SUBMIT COMMENTS AND QUESTIONS REGARDING THE FS ADDENDUM AND THE NEW PROPOSED PLAN. EPA CONDUCTED ANOTHER PUBLIC MEETING ON AUGUST 1, 1989, TO DESCRIBE THE PROPOSED PLAN AND ANSWER QUESTIONS FROM THE COMMUNITY. PRESS RELEASES AND PUBLIC NOTICE WERE AGAIN PUBLISHED IN THE COMMERCE CITY SENTINEL AND THE COMMERCE CITY BEACON ANNOUNCING ALL THESE ACTIVITIES.

ONLY THE CITY OF COMMERCE CITY RESPONDED IN WRITING, AND THERE WAS LIMITED COMMENT ON THE SELECTED REMEDY DURING THE AUGUST 1 PUBLIC MEETING. THE PRIMARY CONCERN OF THE CITY OF COMMERCE CITY WAS THAT THE COC PROPERTY BE REMEDIATED TO RESIDENTIAL-USE STANDARDS. A RECORD OF DECISION WAS SUBSEQUENTLY PREPARED WHICH ADDRESSED ONLY THE HIGHLY CONTAMINATED SOILS. REMEDIAL DESIGN OF OU1 WAS INITIATED FOLLOWING ROD SIGNATURE. SAMPLES OF THE COC AREA WERE COLLECTED DURING DESIGN STAGES. ANALYTICAL RESULTS FROM THAT SAMPLING PERIOD WERE EVALUATED IN AN ENDANGERMENT ASSESSMENT PREPARED FOR OU5. NEW ACTION LEVELS AND SOIL VOLUMES WERE CALCULATED USING ALL THE OU5 DATA.

REMEDIAL ALTERNATIVES PREVIOUSLY IDENTIFIED AND SCREENED FOR THE COC AREA THROUGH THE INITIAL RI/FS (CDM, 1989) AND FEASIBILITY STUDY ADDENDUM FOR OU1 (SAIC, 1989) WERE UTILIZED IN THE FS FOR OU5. COSTS OF SELECTED ALTERNATIVES WERE REVISED BASED ON THE REFINED SOIL VOLUME INFORMATION. A PROPOSED PLAN AND FS FOR OU5 WERE RELEASED TO THE COMMUNITY FOR PUBLIC COMMENT IN JULY 1990.

C. SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD

COMMENTS RAISED DURING THE PUBLIC COMMENT PERIOD ON THE FS AND PROPOSED PLAN ARE SUMMARIZED BELOW. THE COMMENT PERIOD WAS HELD FROM JULY 27 TO AUGUST 27, 1990. THE COMMENTS ARE CATEGORIZED BY RELEVANT TOPICS.

REMEDIAL ALTERNATIVE PREFERENCES

EACH OF THE COMMENTORS ON THE FS AND PROPOSED PLAN EXPRESSED A PREFERENCE FOR SPECIFIC ALTERNATIVES.

COMMENT 1: THE CITY OF COMMERCE CITY FEELS THAT ALTERNATIVE NO. 4, ON-SITE SOIL WASHING WITH OFF-SITE DISPOSAL OF RESIDUALS, WOULD BE AN ACCEPTABLE CLEANUP ALTERNATIVE IF SPECIFIC CONCERNS ARE ADDRESSED. THE CITY'S CONCERNS INCLUDED IMPLEMENTING AN AIR MONITORING AND DUST SUPERVISION PROGRAM DURING REMEDIATION, A RESTRICTION OF ACCESS DURING REMEDIATION AND A NOTIFICATION PLAN FOR THE CITY SHOULD ANY THREAT TO PUBLIC HEALTH AND SAFETY OCCUR.

EPA RESPONSE: EPA'S POLICY IS THAT APPLICABLE AND/OR RELEVANT AND APPROPRIATE FEDERAL AND STATE LAWS BE APPLIED TO SUPERFUND REMEDIES TO ENSURE ADEQUATE PROTECTION OF PUBLIC HEALTH, WELFARE AND THE ENVIRONMENT. IN THIS CASE, SPECIFIC LAWS REGARDING AIR EMISSIONS AND PARTICULATES WILL APPLY DURING REMEDIATION ACTIVITIES. THE REQUIREMENTS OUTLINED ON THESE LAWS WILL BE MET. THE ARARS ARE DELINEATED IN APPENDIX B OF THE RECORD OF DECISION. ADDITIONALLY, SITE ACCESS WILL BE RESTRICTED TO THOSE INVOLVED WITH THE REMEDIATION EFFORT.

COMMENT 2: THE CITY FEELS THAT ALTERNATIVE #3 OFF-SITE DISPOSAL WOULD NOT ASSURE A PERMANENT SOLUTION TO THE HAZARDS AT THE SITE DUE TO EPA'S INCLUSION OF "INSTITUTIONAL CONTROLS" IN THE PROPOSED PLAN.

EPA RESPONSE: EPA BELIEVES THAT INSTITUTIONAL CONTROLS WILL NOT ALTER THE CITY'S PLANNED USE OF THE AREA. EPA INTENDS TO RETURN THE SITE TO INDUSTRIAL USE BASED ON THE CITY'S COMPREHENSIVE PLAN FOR 1985 TO 2010

AND THE HISTORICAL USE OF THE AREA. IMPLEMENTATION OF LAND USE RESTRICTIONS WILL REQUIRE THE COOPERATIVE EFFORTS OF STATE, COUNTY, AND CITY OFFICIAL TO BE SUCCESSFUL.

COMMENT 3: COMMENTS SUBMITTED BY HOLLAND & HART ON BEHALF OF ITS CLIENT FIRST INTERSTATE BANK, TRUSTEE FOR THE PHILIP C. MOZER TRUST INDICATE THAT THEY BELIEVE CAPPING IS THE MORE APPROPRIATE REMEDIAL ALTERNATIVE FOR THE SOILS AT THE COC SITE. HOLLAND & HART BELIEVE THAT CAPPING WOULD BE A PERMANENT REMEDY, IS COST EFFECTIVE AND PROTECTIVE OF THE ENVIRONMENT AND HUMAN HEALTH. HOLLAND & HART DO NOT BELIEVE THE INFORMATION PRESENTED IN THE FS ON THE SOIL WASHING ALTERNATIVE IS SUFFICIENT TO ALLOW FULL DEVELOPMENT AND EVALUATION OF THE TREATMENT TECHNOLOGY, TO SUPPORT REMEDIAL DESIGN, AND TO REDUCE THE COST AND PERFORMANCE UNCERTAINTIES FOR THIS TREATMENT ALTERNATIVE TO ACCEPTABLE LEVELS.

EPA RESPONSE: EPA BELIEVES THAT IN SPITE OF THE SIGNIFICANT UNCERTAINTIES ASSOCIATED WITH SOIL WASHING, IT IS THE BEST ALTERNATIVE GIVEN THE PREFERENCE FOR TREATMENT UNDER CERCLA AND THE PERMANENCY OF THE REMEDY. EPA BELIEVES THAT CAPPING IS NOT ACCEPTABLE BECAUSE IT DOES NOT REDUCE TOXICITY, MOBILITY, OR VOLUME OF THE WASTE, AND IS NOT A PERMANENT REMEDY. EPA PLANS TO FURTHER DETERMINE THE EFFECTIVENESS, IMPLEMENTABILITY AND COST ASSOCIATED WITH SOIL WASHING THROUGH ON-SITE PILOT TESTING. SHOULD THE PILOT TEST INDICATE THAT SOIL WASHING WOULD NOT BE APPROPRIATE FOR FULL SCALE REMEDIATION OF THE SITE, THE ALTERNATIVE FOR OFF-SITE DISPOSAL WILL BE IMPLEMENTED. HOLLAND & HART DID NOT COMMENT ON THE OFF-SITE DISPOSAL ALTERNATIVE.

COMMENT 4: HOLLAND & HART BELIEVE THAT COSTS ASSOCIATED WITH CAPPING ARE TOO HIGH AND QUESTION THE NEED FOR RUN-OFF CONTROLS.

EPA RESPONSE: EPA HAS INCLUDED LONG-TERM MAINTENANCE AND OPERATION COSTS TO THE CAPPING ALTERNATIVE SINCE IT WOULD LIKELY FAIL WITHOUT PROPER OPERATION AND MAINTENANCE. A DRAINAGE SYSTEM OF SOME TYPE IS NECESSARY FOR RUN-OFF EVEN IN A SEMI-ARID ENVIRONMENT.

TECHNICAL QUESTIONS/CONCERNS REGARDING REMEDIAL ALTERNATIVES

COMMENT 5: SOME TECHNICAL COMMENTS REGARDING THE ACTUAL RISKS POSED BY THE CONTAMINATION OF THE SITE WERE MADE DURING THE PUBLIC MEETING BY A FEW INDIVIDUALS. MR. PHILIP MOZER READ A PREPARED SPEECH CONCERNING SITE RISK. THE SPEECH IS INCLUDED IN THE APPENDIX TO THIS RESPONSIVENESS SUMMARY ALONG WITH THE OTHER COMMENT LETTERS.

EPA RESPONSE: EPA CONDUCTED A HEALTH RISK ASSESSMENT FOLLOWING THE METHODOLOGY OF THE EPA RISK ASSESSMENT GUIDANCE. THIS METHODOLOGY HAS BEEN USED ON CERCLA SITES NATIONWIDE. THE METHODOLOGY TAKES INTO ACCOUNT THE TOXICITY OF THE CONTAMINANTS, THE EXPOSURE FREQUENCY AND DURATION, THE PATHWAYS OF EXPOSURE AND THE POTENTIAL EXPOSURE RECEPTORS. A RISK LEVEL THEN CALCULATED TO DETERMINE AN ACCEPTABLE CONTAMINATION RANGE FOR AN OVERALL SITE RISK OF (10-4) TO (10-6). THE EXPOSURE SCENARIOS WHICH MR. MOZER QUESTIONED ARE FURTHER EXPLAINED IN THE RISK ASSESSMENT AS TO THEIR RELEVANCY IN THE RISK CALCULATIONS. SINCE THE COMMENTS RAISED WERE OF A GENERAL NATURE AND DISCUSS ISSUES CREATED IN THE ENDANGERMENT ASSESSMENT, THE COMMENTOR WILL BE WILL BE DIRECTED TO THAT DOCUMENT.

COMMENT 6: A QUESTION WAS RAISED ABOUT THE USE OF BIO-REMEDIATION AS A VIABLE ALTERNATIVE.

EPA RESPONSE: EPA HAS CONDUCTED A PRELIMINARY STUDY ON THE USE OF BIO-REMEDIATION. IT BECAME APPARENT THROUGH THIS EFFORT THAT THE TECHNOLOGY WAS NOT DEVELOPED TO A POINT OF IMPLEMENTATION IN A

TREATABILITY STUDY OR REMEDIAL

ACTION -- FURTHER DISCUSSION OF EPA'S EFFORTS TO EVALUATE BIO- REMEDIATION CAN BE FOUND IN THE OU5 FS, P8 3-2.

D. REMAINING CONCERNS

COMMENT 7: MR. DAVID BUSBY, THE MAYOR OF COMMERCE CITY COMMENTED ON FUTURE LAND USE AND WHO WOULD BE LIABLE FOR THE PROPERTY IN THE FUTURE.

EPA RESPONSE: ACCORDING TO CERCLA, FOR AS LONG AS THE SITE IS ON THE NPL AND POSSIBLY LONGER, THE LIABILITY IS OPEN.

COMMENT 8: MR. REIS FROM THE SIERRA CLUB ASKED ABOUT A DETERMINATION AS TO THE EXTENT OF GROUND WATER CONTAMINATION.

EPA RESPONSE: EPA INDICATED THAT THE GROUNDWATER CONTAMINATION PROBLEM HAS NOT YET BEEN FULLY INVESTIGATED AND WILL BE ON THE AGENDA FOR NEXT YEAR.

COMMENT 9: MAYOR BUSBY ALSO ASKED ABOUT PESTICIDE MIGRATION IN GROUNDWATER AND DUST CONTACT DURING REMEDIATION.

EPA RESPONSE: THERE HAS NOT BEEN EVIDENCE OF A SIGNIFICANT AMOUNT OF GROUNDWATER CONTAMINATION FROM THE PESTICIDES AT THE COC PROPERTY. THE PESTICIDES ARE NOT VERY MOBILE THROUGH THE SOIL AND TEND TO ADSORB TO THE SOIL PARTICLES. THE GREATER THREAT IS FROM DIRECT CONTACT WITH THE SOIL. CONCERNING DUST CONTROL DURING REMEDIATION, EPA WILL IMPLEMENT DUST CONTROL MEASURES WHICH MEET STATE REQUIREMENTS.

E. COMMUNITY RELATIONS ACTIVITIES

APRIL 1985 - EPA MAILED AN INTRODUCTORY FACT SHEET ABOUT THE SITE TO RESIDENTS, BUSINESSES, AGENCIES, AND OTHERS (INCLUDING PRPS) ON THE MAILING LIST.

AUGUST 27, 1985 - EPA MET WITH PRPS.

SEPTEMBER 1985 - EPA PARTICIPATED IN A PUBLIC MEETING ORGANIZED BY CITIZENS AGAINST CONTAMINATION.

OCTOBER 1985 - EPA DEVELOPED A COMPREHENSIVE LIST OF PROPERTY OWNERS' NAMES AND ADDRESSES.

NOVEMBER 1985 - EPA MAILED ANOTHER FACT SHEET PROVIDING ANSWERS TO QUESTIONS TYPICALLY ASKED DURING INVESTIGATION AND CLEANUP OR HAZARDOUS WASTE SITES.

NOVEMBER 1985 - EPA PROVIDED INFORMATION ON WATER CONTAMINATION FOR A PUBLIC MEETING ORGANIZED BY CITIZENS AGAINST CONTAMINATION.

JANUARY 1986 - EPA CONTACTED PROPERTY OWNERS TO INFORM THEM OF SITE ACTIVITIES.EPA ALSO CONTACTED PUBLIC OFFICIALS.

APRIL 1986 - EPA PREPARED PHOTOS FOR USE IN A DISPLAY ILLUSTRATING THE RI/FS PROCESS.

FEBRUARY 1987 - EPA UPDATED ITS LIST OF PROPERTY OWNERS.

APRIL 1987 - EPA SURVEYED RESIDENTS ABOUT WATER USE HABITS.

NOVEMBER 1987 - EPA CONTACTED RESIDENTS AND BUSINESSES TO IDENTIFY AND CHECK THE STATUS OF METHANE VENTING SYSTEMS NEAR THE SITE.

MAY 1988 - EPA REQUESTED AND RECEIVED ACCESS PERMISSION FOR SOIL SAMPLING ON CERTAIN PROPERTIES.

OCTOBER 24, 1988 - EPA MADE A PRESENTATION TO COMMERCE CITY OFFICIALS TO INFORM THEM OF PROGRESS AND PLANS AT THE SITE, AND TO OBTAIN THEIR REACTIONS TO THE POTENTIAL REMEDIAL ALTERNATIVES DEVELOPED DURING THE FEASIBILITY STUDY (FS).

JANUARY 6, 1989 - EPA MAILED A THIRD FACT SHEET DESCRIBING THE PROPOSED PLAN FOR OU1. ALSO ON THE SAME DATE, EPA MADE THE FS FOR OU1 AVAILABLE TO THE PUBLIC AT THE INFORMATION REPOSITORIES LISTED IN THE PROPOSED PLAN.

JANUARY 1989 - EPA ISSUED NOTICE OF A PUBLIC COMMENT PERIOD ON THE FS AND PROPOSED PLAN.

JANUARY 31, 1989 - EPA HELD A PUBLIC MEETING AT COMMERCE CITY HALL TO DESCRIBE THE RESULTS OF THE RI/FS AND TO RESPOND TO QUESTIONS AND COMMENTS. APPROXIMATELY 16 PEOPLE ATTENDED, NOT INCLUDING EPA OR CONTRACTOR PERSONNEL.

JANUARY-FEBRUARY 1989 - EPA EXTENDED ITS PUBLIC COMMENT PERIOD ON THE PROPOSED PLAN FROM JANUARY 13 TO FEBRUARY 13 TO JANUARY 13-FEBRUARY 22, AS REQUESTED BY SOME PRPS.

MARCH-AUGUST 1989 - EPA RE-EVALUATED ALTERNATIVES AND ISSUED AN ADDENDUM TO THE FS. A NEW PROPOSED PLAN WAS ISSUED IN JULY 1989. THE PUBLIC COMMENT PERIOD EXTENDED THROUGH MID-AUGUST. A PUBLIC MEETING WAS HELD AUGUST 1, 1989.

A RECORD OF DECISION WAS PREPARED IN SEPTEMBER 1989 WHICH ADDRESSED HIGHLY CONTAMINATED SOIL, VOC'S, AND STRUCTURES.

AN FS AND PROPOSED PLAN FOR OU5 WAS PREPARED AND RELEASED FOR PUBLIC COMMENT IN JULY 1990. A PUBLIC MEETING WAS HELD AUGUST 9, 1990. THE PUBLIC COMMENT PERIOD EXTENDED THROUGH AUGUST 27, 1.990.